NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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June 27, 2022

To Interested Parties:

Re: Skaneateles Lake Aquatic Pesticide SPDES Permit
DEC Permit # 7-3150-00112/00004; SPDES # NY0300004
Town of Skaneateles, Onondaga County
Response to Public Comments

Thank you for your comments on the above referenced State Pollutant Discharge Elimination System (SPDES) application. The New York State Department of Environmental Conservation (DEC) has carefully reviewed and considered the comments received during the public comment periods and the Part 621 Legislative (Public Comment) Hearing associated with the application of the aquatic pesticide EarthTec in Skaneateles Lake. The relevant comments are summarized, and the Department's responses are provided in the enclosed Responsiveness Summary.

After carefully considering the comments provided, DEC has issued a SPDES Permit for the proposed activity. Please find the final permit and fact sheet enclosed for your review.

Thank you for your comments. If you have any questions, please feel free to contact me via email at DEP.R7@dec.ny.gov or at 315-426-7438.

Sincerely,

Jonathan Stercho

Jonathan Stercho
Deputy Regional Permit Administrator
Division of Environmental Permits, Region 7

Encl: Responsiveness Summary
SPDES Permit
Fact Sheet

Responsiveness Summary
Permit No. NY0300004, DEC # 7-3150-00112/00004
City of Syracuse Department of Water
Skaneateles Lake

6/27/2022

Background

The New York State Department of Environmental Conservation (NYSDEC) issued a final State Pollutant Discharge Elimination System (SPDES) permit for City of Syracuse Department of Water on 6/27/2022. The final permit was developed as a new permit pursuant to 6 NYCRR Part 750 following the receipt of an application form for a *SPDES Permit to Discharge a Pesticide Labeled for Aquatic Use* as outlined in the final Fact Sheet. The draft permit was publicly noticed in the *Environmental Notice Bulletin* on July 14, 2021, and in the Skaneateles Press on July 28, 2021. The original public comment period ran from July 14, 2021, through October 1, 2021. The public comment period was reopened from January 26, 2022, through March 2, 2022. Notices were published in the Environmental Notice Bulletin on January 26, 2022, and the Post Standard on January 26, 2022. The latter notice advised the public of the opportunity to participate in a Part 621 Legislative (public comment) hearing on March 1, 2022. The public comment period closed on 3/2/2022.

As required by 6 NYCRR 621.10(e), NYSDEC has prepared this Responsiveness Summary to address the comments that were received on the draft permit. See Appendix A for a list of commenters. Frequently raised comments are summarized and presented as one general comment and are not repeated as specific comments under the Responsiveness Summary. The full text of all comments received as part of the public notice process, including a transcript of comments received orally during the legislative hearing held on March 1, 2022, are included in Appendix B of this Responsiveness Summary. All comments on the draft permit and fact sheet are addressed below with commenter(s) referenced at the end of each comment.

Contents

I. General Comments

A. Opposition until more information is available

Comment 1: Several comments were received regarding opposition to this permit due to too many uncertainties and not enough reassurances regarding EarthTec and its potential use. Many oppose the permit until more information is provided:

- regarding the selection of EarthTec and assessment of alternative controls;
- regarding the risks associated with treating *Microcystis* with a product such as EarthTec that could remain in the lake's ecosystem over time;
- regarding the effectiveness of the proposed treatment;
- by an entity like the United States Environmental Protection Agency (USEPA) on the potential impacts to a waterbody from EarthTec use; and
- regarding the impacts to other similar waterbodies, especially those also with filtration avoidance waivers, including information on the long-term risks and threats due to comparable EarthTec use.

(1-134, 136-140, 143, 145-208, 210-216, 226, 227, 229, 231, 232, 235-238, 240, 242, 243, 248, 251, 252, 254-258, 260, 262-269, 271, 274, 275, 279, 280)

Response 1: NYSDEC acknowledged the concerns and requests for more time to gather information by extending the public comment period and holding a Part 621 Legislative (public comment) hearing on March 1, 2022. The initial meeting to begin the review of the proposed action was held on July 19, 2018, between NYSDEC, local municipal officials, Onondaga County Health Department, and EarthTec representatives.

Response 2 discusses watershed planning and Harmful Algal Blooms (HABs) mitigation efforts underway in Skaneateles Lake. Watershed planning is a long-term approach and in the interim, short-term controls, such as pesticide application, may be needed to protect drinking water supplies. EarthTec was selected by the City of Syracuse based on the goal of reducing microcystin concentrations at the drinking water intakes.

EarthTec is registered as a pesticide with USEPA, Reg. No.: 64962-1, and was first accepted for registration on December 11, 2000 by NYSDEC as a restricted use pesticide under 6 NYCRR Part 326. Updated EarthTec labels have been accepted by NYSDEC over the years. NYSDEC recognizes that there will be some deposition of copper resulting from this application; however, NYSDEC has chosen to re-register this pesticide product since adverse impacts of copper have been considered as a component of the USEPA registration process.

EarthTec also meets NSF American National Standard 60 for Drinking Water Treatment Chemicals. The application of the pesticide must be conducted by a certified pesticide applicator in accordance with the product label. NYSDEC does not engage in the process of pesticide selection with an applicant.

NYS Department of Health (DOH) supports the approval of this permit as another tool to help protect the public water supply during HAB events. The proposed copper algaecide product is designed to maintain lower levels of copper within the water column for a longer time to prevent or minimize cell lysis which has the potential to elevate microcystin in the water column. The treatment should cause the cells to drop out of the water column

without significant microcystin release/cell lysis. A primary purpose of this permit is to require monitoring of the treated area to ensure that microcystin levels do not exceed the DOH guidance level of 4 µg/L.

B. Watershed Protection

Comment 2: Several comments were received regarding the need for a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in the lake watershed. Commenters also stated that NYSDEC and City of Syracuse need to continue to invest in, and expedite the development of, more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of HABs, such as preventing or minimizing the use of chemical fertilizers in the watershed, reducing agricultural nutrient sources in the watershed, and inspecting septic tanks along the lake. (1-61, 63-135, 137, 139, 143-208, 210, 211-216, 219, 226, 233, 241, 244, 247, 250, 252, 261, 267, 271, 278)

Response 2: In 2018, Skaneateles Lake was designated as one of twelve priority waterbodies statewide under the governor's Harmful Algal Bloom Initiative. The initiative included the creation of a Harmful Algal Bloom Action Plan for Skaneateles Lake which engaged national experts and local steering committees, identified unique factors fueling HABs, and recommended tailored strategies to reduce blooms. Many of the strategies identified were funded by NYSDEC including watershed and in-lake modeling for Nine Element Watershed Management Plan development, several Water Quality Improvement Project (WQIP) funded applications for source water protection and nonpoint source control, and advanced HAB research including an intensive lake characterization project, deployment of real-time monitoring platforms in the open water and nearshore, and tributary monitoring. Furthermore, NYSDEC coordinated with the Skaneateles Lake Association to create a HAB Surveillance Network by training and engaging with over 50 volunteers to identify HABs and submit reports to NYHABS.

The Skaneateles Lake watershed community is currently developing a Nine Element Watershed Management Plan which will quantify pollutant sources, identify water quality goals, and create an implementation plan to improve and protect Skaneateles Lake.

The City of Syracuse is also responsible for enforcing the Skaneateles Lake Watershed Rules and Regulations which include septic system inspections and reviewing design and site plans for any ground disturbance greater than 5,000 ft^2. Additionally, the City of Syracuse created the Skaneateles Lake Watershed Agricultural Program to assist in the control of agricultural nutrient loading in the watershed.

See Response 10 for discussion of the goal of the EarthTec application to the drinking water source.

C. Copper Concerns

Comment 3: Several comments were received regarding the concern for copper toxicity to humans, fish, and other aquatic life stating copper is not biodegradable and will get trapped in the lake sediment. These commenters encouraged NYSDEC to establish a baseline of copper in the lake prior to application of EarthTec, which is a copper sulfate compound. Commenters also encourage NYSDEC to follow the NYSDEC 1999 *Technical Guidance for Screening Contaminated Sediment*, which defines the maximum

contaminant content of sediments that is protective of human health and the protection of aquatic and benthic organisms and wildlife. Commenters also stated that evidence shows levels of copper in the lake sediment are already unacceptable and further evaluation is needed regarding impacts on aquatic life. Additionally, they requested NYSDEC provide a basis for the decision to allow the addition of copper to the lake through the application of EarthTec and suggest further copper analysis is needed prior to application. (1-61, 63-134, 143, 145-208, 210, 211-216, 219, 224, 226, 229, 232, 240, 241, 242, 245, 247, 251, 255, 256, 265, 267, 273, 275)

Response 3: NYSDOH supports the approval of this permit as another tool to help protect the public water supply during HAB events. EarthTec meets NSF American National Standard 60 for Drinking Water Treatment Chemicals; therefore, it is approved for regulated use on water supplies, including those that are unfiltered. The EarthTec pesticide label has been approved by NYSDEC for algae control. This approval process considers various factors related to the use of copper sulfate pesticide products for algae control and includes information provided by USEPA regarding human health and the impacts to aquatic organisms. As stated in Response 1, NYSDEC recognizes that there will be some deposition of copper resulting from this application; however, NYSDEC has chosen to re-register this pesticide product since adverse impacts of copper have been considered as a component of the USEPA registration process during the risk analysis. In addition, copper sulfate is used across New York State for algae control and NYSDEC has monitored many of the applications to determine if there were any impacts to aquatic life. See Responses 27, 31, and 32 for further discussion of the effect on aquatic life.

D. Water Quality Concerns

Comment 4: Several comments were received that express concerns about the use of copper sulfate on the pristine quality of the vital resource that is Skaneateles Lake. Many of these comments expressed concern for the water quality of the lake in relation to safe recreational and unfiltered drinking water uses, as well as protection of aquatic life. Several also called for assessment of the short- and long-term effects of EarthTec use on water quality. (17, 23, 25, 31, 32, 64, 68, 73, 91, 92, 94, 110, 115, 122, 124, 127, 128, 130, 135-142, 148, 149, 152, 154, 157, 162, 168, 214, 217, 219, 221-227, 230, 233, 234, 241, 242-245, 247, 248, 249, 253, 263, 266, 269, 273)

Response 4: NYSDEC's mission is "To conserve, improve and protect New York's natural resources and environment and to prevent, abate and control water, land and air pollution, in order to enhance the health, safety and welfare of the people of the state and their overall economic and social well-being." NYSDEC is committed to supporting the protection of Skaneateles Lake water quality through a variety of efforts (see Response 2). The Finger Lakes Watershed Hub (Hub) was established in the Division of Water in 2017 to preserve and protect the water quality of the Finger Lakes. Since the creation of the Hub, the Citizens Statewide Lake Assessment Program (CSLAP), which is NYSDEC's citizen science water quality program, was reestablished on Skaneateles Lake through the creation of two sampling sites. In addition to the water quality data collected as part of CSLAP, the Hub also conducts winter water quality sampling to understand water quality conditions outside the traditional monitoring months.

In 2019, NYSDEC established an advanced HAB research initiative. The water quality collected as part of these programs has been documented in several reports (Finger

Lakes Water Quality Report) and is available on the Division of Water Monitoring Data Portal and on the US Geologic Survey Water Quality Data Viewer. The data will also be used in NYSDEC-funded lake and watershed modeling efforts to understand and quantify pollutant sources in the Skaneateles Lake Nine Element Plan.

NYSDEC is committed to investigating and understanding the water quality of Skaneateles Lake and watershed as well continuing to support the protection of Skaneateles Lake water quality through a variety of implementation efforts outlined in Response 2. See Responses 27, 31, and 32 for further discussion of the effect on aquatic life.

City of Syracuse is applying for a SPDES permit to protect this unfiltered drinking water source. According to a NYSDOH factsheet on *Harmful Blue-green Algae Blooms: Understanding the Risks of Piping Surface Water into Your Home*, "Harmful blue-green algae blooms have been occurring in surface waters throughout New York State. Contact with water with blue-green algae and their toxins can cause health effects. Symptoms include diarrhea, nausea or vomiting; skin, eye or throat irritation; and allergic reactions or breathing difficulties. Animal illnesses and deaths also have occurred when animals consumed large amounts of accumulated algal scum from along shorelines or when animals groomed blue-green algal scums from their fur." Additionally, NYSDOH advises the public to "never drink, prepare food, cook or make ice with untreated surface water. You may also consider not using it during a bloom for showering, bathing or washing, especially if your water looks cloudy. Even if you have an in-home treatment system, use bottled water during a bloom. Don't drink, prepare food, cook or make ice with surface water during a bloom. Boiling the water will not remove blue-green algae or their toxins."

NYSDOH supports the approval of this permit as another tool to help protect the public water supply during HAB events. EarthTec meets NSF American National Standard 60 for Drinking Water Treatment Chemicals; therefore, it is it is approved for regulated use on water supplies, including those that are unfiltered. Additionally, in an abundance of caution, the permit requires monitoring for the microcystin guidance value. NYSDOH concurs that the proposed monitoring program is adequate to inform beach operators and recreational users if microcystin levels in the water exceeds the recreational guidance value of 4 µg/L. Additionally, see Response 11 for details about the public notification process the permittee must follow prior to a treatment application.

The EarthTec pesticide label has been approved by NYSDEC for algae control. This approval process considers various factors related to the use of copper sulfate pesticide products for algae control, including information provided by USEPA regarding human health and the impacts to aquatic organisms. The EarthTec pesticide label contains precautionary statements to protect fish and other aquatic organisms. It also limits the pesticide dosage rate in drinking water and requires additional potable water treatment.

NYSDOH has a webpage and a factsheet, both titled Concerns About Surface Water as a Drinking Water Source, which state that "there are risks from using water from any surface water source as drinking water, unless that water is properly filtered and disinfected…To make surface water fit to drink, treatment is required." NYSDOH encourages the public to contact their local health department if they use surface water

as their private water supply source and to avoid the use of surface water for their drinking water needs.

E. Operation and Emergency Plans

Comment 5: Several comments were received regarding the need for a sufficient operations, maintenance, and monitoring plan and how the treatment application will be incorporated into a well-established and vetted emergency action plan. These comments suggest that the permit should require a comprehensive plan for monitoring potential impacts from the proposed treatment solution to be provided in advance of permit authorization (1-61, 63-134, 143, 145-208, 210, 211-216, 226, 232, 236, 247)

Response 5: NYSDOH concurs that the proposed monitoring program is adequate to inform beach operators and recreational users if microcystin levels in the water exceed the recreational guidance value of 4 µg/L.

All pesticides in New York State are required to be used in accordance with their pesticide label directions. The EarthTec label has specific directions that are required to be followed to prevent environmental impacts and human health impacts from the treatment. NYSDEC routinely monitors pesticide applications and conducts inspections to provide regulatory oversight of pesticide applications to ensure they are conducted in accordance with NYSDEC Pesticide Program rules and regulations.

F. Communication and Public Participation

Comment 6: Several comments were received regarding communication about the proposed permit with the public and barriers to public participation. These comments cited concerns about using good channels for communicating with the public and whether enough time was given for the public to learn about the public hearing. Additionally, they noted that holding a public hearing in the winter may have created a barrier to reaching Skaneateles Lake residents since many residents are seasonal. (76, 246, 266, 273, 276, 277)

Response 6: Uniform Procedure Act (UPA) Regulations, 6 NYCRR Part 621 (Article 70 of the Environmental Conservation Law), of which this application was subject to and processed in accordance with, are intended to ensure a fair, timely, and thorough review of applications before NYSDEC, as well as encourage public participation in the application process. As stated in the above Background section of this summary, this application underwent two public comment periods, a public informational meeting, and a legislative (public comment) hearing to solicit public input on the proposal. The public comment periods and public hearing were appropriately noticed, per the above referenced regulations, in NYSDEC's Environmental Notice Bulletin and the local newspaper, *The Post Standard*. Sufficient time to be aware of and participate in such comment periods were granted in accordance with New York State statutory requirements. Further, comments could be provided by any individual who could not attend the public comment hearing (as well as during the two public comment periods) via standard mail and email; therefore, minimizing logistical issues with providing comments on this project to NYSDEC.

G. Microcystin

Comment 7: Several comments were received regarding concerns about uncontrolled release of microcystin and the risks associated with treating *Microcystis* with a product such as EarthTec that could remain in the lake's ecosystem over time. (1-61, 63-134, 143, 145-208, 210, 211-216, 265, 275)

Response 7: NYSDOH supports the approval of this permit as another tool to help protect the public water supply during HAB events. As discussed in Response 1, the proposed copper algaecide product is designed to keep much lower levels of copper within the water column for a longer period, which should allow the copper and treated cells to settle out of the water column together. Once the cells drop out of the water column, microcystin will largely be bound by sediments and degraded by bacteria.

A study by Iwinski, et al. 2016[1] demonstrated that copper treatments, even at low levels (as being proposed by the City of Syracuse), can be effective in controlling blooms that increase microcystin levels. Additionally, low dose treatments have the added benefit of not lysing cells and releasing microcystin into its dissolved phase, thereby reducing the amount of microcystin in the water column at the time of the treatment.

H. EarthTec Toxicity

Comment 8: Several comments were received regarding the EarthTec warning label which state that it can cause irreversible eye damage, be harmful if swallowed, be toxic to fish, and cause significant reduction in aquatic life. These comments also expressed concerns about causing harm to endangered species (e.g., certain mussel species in New York), and stated that use of the product may be a violation of federal law if it causes death in endangered species or adverse modification of their habitat. (101, 210, 230, 243, 257, 267)

Response 8: The SPDES permit requires EarthTec to be applied in accordance with the label and all NYSDEC Pesticide Program rules and regulations, which will minimize the risks of the hazards stated on the pesticide label. Responses 22 and 23 discuss the environmental review process undertaken as part of the permit application. See Responses 4 and 31 for additional discussion about risks to aquatic life.

Additionally, in the application, the permittee identifies label warnings regarding potential environmental hazards. To prevent oxygen loss in the waterbody due to weed and/or algae decay, the label requires no more than half the water body be treated per application. The area the City proposed to treat (570 acres) is approximately 1/15th the area of the lake, well below the area threshold. The label also requires that treatment occur at least 14 days apart, the pH of the waterbody is greater than 6.5, and the alkalinity of the waterbody is greater than 50 mg/L to prevent acute toxicity in aquatic organisms. Analytical testing at Skaneateles Lake has been conducted for pH and alkalinity and identified a pH between 7.9 – 8.4 (which is consistent with Citizens Statewide Lake Assessment Program (CSLAP) data) and alkalinity of approximately 100 mg/L, both values are well above the label requirements; however, in response to these comments,

[1] Kyla J. Iwinski, A. J. (2016). Cellular and aqueous microcystin-LR following laboratory exposures of Microcystis aeruginosa to copper algaecides. Chemosphere, 74-81.

confirmatory sampling for pH and alkalinity prior to treatment has been added to the permit *Treatment Requirements* section.

I. Additional Pesticide Concerns

Comment 9: Several comments were received regarding replacing one toxicity concern (microcystin/HABs) with another (copper). Several comments also expressed concern that when the algae dies it will sink to the bottom of the lake and release additional toxins or trigger additional blooms. These comments also express concern that the decomposing cells will add to the nutrient load of the lake. (226, 247, 256, 264, 278)

Response 9: As referenced in these comments, microcystin is a public health concern. Response 4 expands on the public health concerns related to recreational contact with water containing microcystin. As discussed in Responses 1, 3, 4, and 7, the City of Syracuse applied for this permit to obtain additional resources to protect the drinking water supply source and the risk of microcystin to human health.

Several copper sulfate products, including EarthTec, are registered with NYSDEC and have been successful tools to control algae, including HABs, for many years. An evaluation during the registration process for any pesticide will consider the risks and the benefits associated with the use. NYSDEC recognizes that there will be some deposition of copper resulting from this application; however, NYSDEC has chosen to re-register this pesticide product since adverse impacts of copper have been considered as a component of the USEPA registration process during the risk analysis.

The permit requires the permittee to sample for microcystin within 24 hours of pesticide treatment. Monitoring within the treatment area will occur daily up to 14 days until the microcystin concentration is less than the DOH guidance value of 4 µg/L.

Regarding concerns of nutrient loading by the cells themselves, the microscopic cells are not likely to alter the nutrient dynamics following the application of EarthTec. The cells do not have substantial organic content; they will degrade, and additional nutrients will not be added to the lake. See Response 18 for further discussion of rebounding blooms.

J. Effectiveness of Treatment Plan

Comment 10: Several comments were received regarding concern over whether or not the application of the pesticide in the proposed treatment area would be effective for protecting the City of Syracuse drinking water intakes. (26, 264, 265)

Response 10: According to the permit application *Supplemental Documentation*, "*The City does not intend to utilize EarthTec as a reactionary measure to a lake-wide algal bloom. The objective is to decrease densities of microcystin producing cyanobacteria.*" Through conversations with the City of Syracuse, NYSDEC understands that the treatment is not intended to cover the water intake areas. *Microcystis* colonies have rarely been detected over the City's water intakes from 2017 through 2021. Treating the near shore areas of Skaneateles Lake is designed to protect the water supply in a variety of ways. The goal is to keep the amount of cyanobacteria and microcystin collected by the intakes as low as possible. The highest levels of microcystin have been detected in areas where there are dense accumulations of cyanobacteria biomass, particularly when

dominated by *Microcystis*, along the near shore areas. Source water treatments are designed to stop large amounts of cell bound microcystin from moving around the lake, and over water intakes, suppressing blooms in their early stages and hopefully stopping large basin wide blooms from ever occurring. It is the City of Syracuse's goal to drop the cyanobacteria along with their cell-bound microcystin out of the water column in near-shore areas to keep both away from water intakes.

Response 7 summarizes the results of the study by Iwinski, et al. 2015, which found that low concentrations of copper were effective in reducing microcystin in the aqueous phase and overall.

K. Notifying the Public Prior to Treatment

Comment 11: Several comments were received regarding how the permittee will sufficiently notify the property owners and water users in a timely manner, specifically within 48 hours. The commenters also expressed concerns about how the pesticide treatment would affect water use: if recreation will have to stop; if residents will have to stop drawing water from the lake; will the NYSDEC boat launch be closed during treatments; will safety data sheets be distributed to owners prior to treatment? (76, 210, 226, 248, 259, 273)

Response 11: The purpose of the pesticide pre-treatment notification is to inform riparian owners and recreational water users of the specific date of the pesticide application. This notice will be completed as described in the *Discharge Notification Requirements* in the permit. Furthermore, it is a certified pesticide applicator's responsibility to provide the pesticide label either electronically or in written format to riparian owners; however, there is no requirement to provide the Safety Data Sheet. In response to these comments, the *Special Conditions* and *Discharge Notification Requirements* sections of the permit have been revised.

Copper sulfate pesticide treatments conducted by a recognized water supply agency in its water supply are exempt from the 6 NYCRR Part 327 aquatic vegetation control regulation requirements; however, the required water use restrictions under 6 NYCRR Section 327.6 regarding the use of copper sulfate, the active ingredient in EarthTec, including prohibiting bathing and livestock watering for 24 hours following the treatment have been incorporated into this permit. Signs shall be posted at beaches and boat launch areas as required in the *Discharge Notification Requirements*.

Additionally, EarthTec meets NSF American National Standard 60 and is safe to use for drinking water treatment. Response 4 discusses NYSDOH's concerns about using surface water as a private drinking water source; however, NYSDOH concurs that the proposed monitoring program is adequate to inform beach operators and recreational users if the microcystin level in the water exceeds the recreational guidance value of 4 µg/L. The drinking water standard for copper is 0.200 ppm (mg/L). For the requested treatment, the application rate is below the drinking water standard.

L. Support for the use of copper sulfate

Comment 12: Several comments were received in support of this permit and the use of copper sulfate to protect the drinking water source. Commenters, some of whom are Skaneateles Lake Association members, cited effective historic use of copper sulfate in

the watershed for HABs treatment; stated they felt the risk to their health from microcystin is greater than the risk from copper. (113, 209, 218, 228, 270)

Response 12: Copper sulfate was applied as an algaecide in Skaneateles Lake from 1926 to 1972. The principal reason the City of Syracuse is applying for a SPDES permit is to protect this drinking water source. The treatment area was selected to avoid areas directly over the City's intake and target areas nearby with high algal biomass and greatest potential to let cells drift over the intakes. The proposed copper algaecide product is designed to maintain lower levels of copper within the water column for a longer time to prevent or minimize cell lysis which has the potential to elevate microcystin in the water column. The treatment should cause the cells to drop out of the water column without significant microcystin release/cell lysis

II. Specific Comments

A. Concerns about EarthTec

Comment 13: "While EarthTec is noted to meet NSF American National Standard 60 for Drinking Water Treatment Chemicals when applied beneath guidance thresholds, what is unclear or unprovided at this point are the long term risks and threats not only to humans, but also to how the application of the product could impact the lake's ecosystem." (1)

Response 13: The pesticide EarthTec has been approved by the USEPA and NYSDEC for treatments to water supplies. This approval process considers various factors related to the use of copper sulfate pesticide products in water supply waters including human health and the impacts to aquatic organisms. Copper, the pesticide active ingredient in EarthTec, has been used for many years and has gone through the USEPA registration process, including a USEPA reregistration review.

Comment 14: "Given that there is no satisfactory data or case studies have been provided covering a) the long-term effects on humans or pets exposed through ingestion of lake water, swimming and recreational activities, etc.; b) long-term effects on aquatic life, lake oxygen levels, etc.; or c) the potential need for reapplication, etc. in the face of rising average temperatures and increased agricultural/residential nutrient runoff, the approval of this application would be, at best, irresponsible." (62, 229, 232, 236)

Response 14: Response 1 discusses that EarthTec is registered with USEPA and DEC for use as a pesticide in drinking water supply source water. Responses 27, 31, and 32 discuss the effects on aquatic life.

The permit application requested up to two treatments of EarthTec for algae control, which are identified in the permit. Any additional treatments will require a modification to the permit. Certain environmental conditions seasonally (e.g., temperature, wind, hydrologic conditions) may impact occurrence of algal blooms; therefore, an additional pesticide application (up to two) may be conducted by the City of Syracuse to protect their water supply.

Comment 15: "What is the method to determine when the chemicals have been completely eliminated from the Skaneateles water Source?" (157)

Response 15: The goal of the pesticide treatment is to reduce the total microcystins in the water column. EarthTec is approved for use on water supplies with no time restrictions on collecting water for drinking water use after it is applied. The chemistry of EarthTec allows copper to remain in the water column for a longer period of time than historic copper sulfate products. When copper remains in the water column for a longer period of time, lower doses of copper can be effective at reducing the algae and microcystin in the water column while only adding a small amount of copper to the sediment. See Response 7 for more information.

Response 1 discusses how the pesticide and algae interact in the water column and how they settle out. Response 1 also discusses the registered use and standards that the pesticide meets. See the *Special Conditions* in the permit for details on actions required if the post-monitoring sampling results exceed the microcystin guidance value.

Comment 16: “Has all of the above been thoroughly investigated enough by the EarthTec company and/or DEC in a lake such as Skaneateles to allow such a treatment? What are the comparisons? Have there been any other natural lakes of this size and capacity, especially those that have filtration avoidance waivers, treated with EarthTec? Is the risk versus benefit ratio tipped too much toward the risk side?

With the levels of microcystin experienced from the lake-wide harmful algal bloom in 2017 and the little impact it had on the municipal water at that time, using the existing tools in their toolbox, is this potential risk worth taking at this time? Is the risk versus benefit tipped too much towards the risk side?

Finally, shouldn't this be considered "experimental use" of such a product, EarthTec, in Skaneateles Lake, with over 200,000 folks drinking this water?” (265)

Response 16: EarthTec was registered as a pesticide with USEPA in 1999, Reg. No.: 64962-1, and was first accepted for registration on December 11, 2000, by NYSDEC as a restricted use pesticide under 6 NYCRR Part 326. Updated EarthTec labels have been accepted by NYSDEC over the years. EarthTec has been approved by the USEPA and NYSDEC for treatments to water supplies. This approval process considers various factors related to the use of copper sulfate pesticide products in water supply waters including human health and the impacts to aquatic organisms. This review process weighs the risks and benefits associated with copper sulfate as a pesticide in water supply waters. Furthermore, copper sulfate has been used for many years to control algae in water supply waters nationally. EarthTec also meets NSF American National Standard 60 for Drinking Water Treatment Chemicals.

This treatment is not considered the experimental use of a pesticide since EarthTec is already registered with USEPA and NYSDEC for this use. The experimental use of a pesticide occurs when the pesticide is either not registered or is not registered for the requested use with USEPA and NYSDEC. When this occurs, a request to conduct pesticide research to USEPA and NYSDEC may be needed.

Copper sulfate pentahydrate, the active ingredient in EarthTec, has been used as an algaecide in Skaneateles Lake for over five decades (1926 – 1972). The algal control program was directed by professionally trained scientists from Syracuse University and SUNY ESF, who specialize in algal studies. Copper is possibly the oldest, most recognizable algaecide in the US and is widely used in water treatment.

B. Copper Concerns

Comment 17: “The NYSDEC 1999 document is very clear in recommending a LEL (Lowest effects level) of 16 mg/Kg dry weight and a SEL (Severe effects level) of 110 mg/Kg dry weight level. It is expected that a large portion of the copper sulfate applied to the northern part of the lake would wind up in the sediments. It is very important to understand what the current copper sediment concentrations are and to what degree the introduction of the Earth Tech product will increase their concentration in the sediment. It is our opinion that the regulatory agency (NYSDEC) has a responsibility to conduct this evaluation using its own guidance prior to approving the use of this EarthTec product in

the direct treatment of the lake water. Skaneateles Lake is an Extraordinary natural resource and deserves this standard of care." (1)

Response 17: The 1999 NYSDEC *Technical Guidance for Screening Contaminated Sediments* was superseded by the 2014 *Screening and Assessment of Contaminated Sediment*. The 2014 document defines screening as "the action of comparing the concentration of contaminants in a sample to a set of numeric screening values, known as Sediment Guidance Values (SGVs). The SGVs identify thresholds for various contaminant concentrations in sediments that can be used as a basic screening tool to identify potential risk to aquatic life. Given no information other than the concentration of a contaminant in sediment, these values allow for a reasonable assessment of the potential for the contaminants to be harmful to aquatic life." The first SGV defines the "concentration of a contaminant below which toxicity is not expected to occur;" therefore, "the contaminant can be considered to present little or no potential for risk to aquatic life." The second SGV "defines the concentration of a contaminant above which toxicity is expected to occur frequently" and "there is a high potential for the sediments to be toxic to aquatic life."

The 2014 guidance document defines low risk copper contamination at sediment concentrations below 32 mk/kg (or ppm) and high risk above 150 mg/kg. When the copper concentration is between 32 – 150 mg/kg, the guidance recommends "additional information is needed to determine the potential risk to aquatic life."

NYSDEC recognizes that there will be some deposition of copper resulting from this application; however, NYSDEC has chosen to re-register copper sulfate pesticide products since the adverse impacts of copper have been considered as a component of the USEPA registration process during the risk analysis. In addition, NYSDEC, as part of its mission, must balance public health and environmental concerns when deciding to allow the use of any pesticides. In the case of copper, a decision was made to permit the use of copper sulfate pesticide products to protect people and waters from algae, including HABs, while research is being conducted regarding the deposition of copper in sediments by NYSDEC for potential updates in permitting requirements. See Responses 27, 31, and 32 for further discussion of the effect on aquatic life.

Comment 18: "Based on DEC data and recent data provided by Syracuse University researchers, Dr. Charlie Driscoll, Dr. Chris Sholz, and Mackenzie Brannon, there's evidence that there are copper levels that, according to the assessment tools within the DEC, would require more evaluation regarding impacts to aquatic life. We ask that the DEC refer to those screening and assessment tools noted in our letters. In the decision-making process, it's also very much recommended that along with the short-term impacts associated with use of EarthTec, that the potential long-term impacts on Skaneateles Lake, with current unacceptable levels of copper, are strongly considered.

I recently read a study titled 'Side Effects of 58 years of copper sulfate treatment of the Fairmont Lakes in Minnesota,' which is not far off from the amount of year where copper sulfate was at in the Skaneateles Lake in the 1920s to 1970s. The study notes negative impacts on fish and aquatic insect populations, increased tolerance of algae to higher copper sulfate doses, a shift from green algae to more cyanobacteria, and

disappearance of aquatic vegetation. The study is still referred to in current watershed plans in Minnesota by their Department of Natural Resources like the Lake Koronis Management Plan and should be considered in this case as well with the permit application." (267)

Response 18: Response 16 discusses NYSDEC's sediment screening guidance referenced in this comment. The study titled "Side Effects of 58 years of copper sulfate treatment of the Fairmont Lakes in Minnesota" addresses lakes with physical features that are dissimilar from Skaneateles Lake. This study focuses on shallow midwestern lakes. Some of the principles may be applicable regarding toxicity, but overall, comparison to a deep, stratified lake is not appropriate.

Comment 19: "I am a lakefront property owner on Skaneateles and would like to register my voice as a VOTE AGAINST using EarthTec for the following reasons:

Copper Sulfate doesn't biodegrade and becomes Hazardous Waste.

There are no guaranteed clean-up commitments and it can be extremely expensive.

Copper Sulfate is toxic to humans.

Copper Sulfate doesn't treat the causes of algae.

Copper Sulfate in detrimental to all aquatic life and plants.

These are just some serious concerns about the use of EarthTec. It is highly corrosive and doesn't necessarily end algae blooms and it can actually contribute to rebound blooms. There are other solutions that don't involve Copper Sulfate and this would possibly be a way that would be much better in a lake that is a source of drinking water and recreation. Please - - DO NOT USE EARTH-TEC IN SKANEATELES." (256)

Response 19: Copper sulfate is not listed as a hazardous waste in 6 NYCRR Part 371.4. Copper sulfate (EarthTec), as it will be applied for HABs control in Skaneateles Lake, has been approved for use as a drinking water treatment chemical under NSF American National Standard 60. The permit requires application by a certified pesticide applicator and application will follow the directions on the label; therefore, risk to human health and aquatic life and plants shall be minimized. See Responses 27, 31, and 32 for further discussion of the effect on aquatic life. Response 1 discusses how the pesticide and algae interact in the water column and how they settle out.

Additionally, copper sulfate has shown to be an effective method of algae control in water supplies nationally. This pesticide will not end the algae blooms in the lake, but it is a method to control algae blooms when they do occur. NYSDEC is not aware of any instances where copper sulfate has contributed to the rebound of algae blooms.

Comment 20: "As already pointed out, there is sufficient copper accumulated in it. I also know that in the 1970s and 80s, I owned a property on Onondaga -- on Lake Ontario on Little Sodus Bay. And at that time, the SE -- the -- the permitting department -- excuse me. It slipped my mind, but in any case, they prohibited the use of copper sulfate, which I and others have been using to preserve the wood on their docks, to treat weeds and other things because it was considered hazardous to the health of those there. And we did not take our drinking water from the lake at that time. So it seems rather

incongruous to me now that application of copper sulfate would be permitted in an area known to be a drinking water supply." (273)

Response 20: Thank you for your comment. NYSDEC does not have records regarding a denial of the use of copper sulfate in Little Sodus Bay; however, as discussed in Response 15, EarthTec has been approved by the USEPA and NYSDEC for treatments to water supplies.

C. Algal Blooms

Comment 21: "Chlorine addition has been sufficient during the worst bloom periods. i.e. September, 2017." (89)

Response 21: Chlorine is not added to Skaneateles Lake. Primary chlorine injection sites are at the water intake cribs and intake manholes associated with each intake. Chlorine is used for disinfection, not for HABs. The permittee has requested the permit to add a tool to their toolbox for protection of the drinking water supply. The permit is for the application of EarthTec during HABs to reduce the risk of microcystin entering the water supply. Response 10 discusses the plan for how EarthTec will be used to protect the water supply.

Comment 22: "That is my drinking water! It is basically unfiltered. We have already learned, too late, about the dangers of the introduction of chemicals in other aspects of life and many of us have family who suffered from cancer of unknown origins. The algae is not a big problem every year so why would we routine apply chemicals that will stay in the system." (154)

Response 22: The requested treatments of EarthTec are to protect the City of Syracuse water supply from HABs. The permit only allows two applications of EarthTec per year. The Pesticide Management Plan, required by the permit, will be used to set criteria as to when a pesticide application will be used to protect the water supply. See Responses 1, 4, 10, and 15 for further discussion on the goal of the proposed pesticide use and why it can be used on a drinking water supply source water. See Response 4 for NYSDOH's concerns regarding use of surface water as a private drinking water supply.

D. Environmental Review Process

Comment 23: "We have a family camp in the lake. Before dumping chemicals in the lake, you need to hold a meeting to explain the process and present the environmental impact review that presumably you have done. I would like to know what plans you have to PREVENT the growth of algae. Who was involved in the decision making?" (40)

Response 23: A public informational session and legislative (public comment) hearing were held, in part, to inform the public on both the application process conducted in accordance with UPA Regulations, and to provide information regarding safety of the application of EarthTec within Skaneateles Lake as proposed within the SPDES application.

Regarding the environmental review, in addition to NYSDEC's multi-discipline evaluation of the SPDES application, the City of Syracuse Department of Water, acting as Lead Agency, determined that the proposal was a Type 1 Action and conducted a coordinated

environmental review pursuant to State Environmental Quality Review (SEQR) Act Regulations (6 NYCRR Part 617). The City further determined that the Action would not result in any potential significant impacts to the environment; therefore, this Action did not require the drafting of an Environment Impact Statement. This determination of no significant effect on the environment was supported by the City's Negative Declaration, dated September 14, 2020.

As stated in Response 2, NYSDEC, City of Syracuse, and local stakeholders are currently working in collaboration on HAB research and on water quality improvement strategies and individual projects.

Comment 24: "The environmental review process for this treatment of a very large public waterbody seems woefully inadequate. DEC Fisheries spent years studying and planning for lampricide treatments on Lake Champlain and the Finger Lakes. Bypassing such processes by classifying this lake as a public water supply and therefore not subject to regular Article 15 review is preposterous." (210)

Response 24: See Response 22 for discussion of the environmental review process. EarthTec is a registered pesticide with NYSDEC and is allowed for the requested use. As stated in the *Pesticide Treatment Information* section of the factsheet the City of Syracuse's application of copper sulfate is exempt from the Article 15 permit; however, NYSDEC is issuing an individual SPDES permit for this pesticide application, which includes notification, monitoring, and application requirements among other conditions.

E. Pesticide Use & Safety

Comment 25: "Additionally, some of the information provided by representatives of EarthTec during the meeting created some confusion in regards to the safety of the product when applied. The SPDES Permit Fact Sheet NY 0300004 notes microcystin as a by-product to the application of EarthTec and mentions 'additional oversight and monitoring to ensure the safety of the public who recreate in the lake.' The fact sheet also notes monitoring at public bathing areas, but does not call for a provision to monitor additional areas where private homeowners recreate as well. Lastly, a representative from EarthTec noted at the public information meeting that it would be safe to swim and drink water immediately after EarthTec was applied to the water. The aforementioned observations in addition to the EPA's Master Label warnings stating to avoid contact and ingestion and to use personal protective equipment when using causes even more uncertainty regarding the use of EarthTec.

The public information meeting was helpful in regards to the overview of timeline and information provided by the NYSDEC and with the City of Syracuse's pledge that the use of the product is viewed similarly to a life insurance policy and that it is for emergency last resort use. Beyond that, the meeting did not seem to address many concerns outlined in SLA's August 5th letter and did not engage other scientific experts that are not affiliated so closely with the EarthTec chemical company." (1)

Response 25: While the EarthTec label cautions about the potential harm it can cause, when applied in accordance with the label, EarthTec is compliant with NSF American National Standard 60 for use as a drinking water treatment chemical. The permit requires

application by a certified pesticide applicator in accordance with the product label. See Responses 1, 4, and 9 for discussion of microcystin risk.

Response 11 discusses the pesticide treatment notification, including that for riparian owners, and post-treatment monitoring requirements. Post-treatment monitoring includes two regulated bathing beach locations and two recreational access locations. Regulated bathing beaches fall under the jurisdiction of the State Sanitary Code Subpart 6-2 and operational water quality monitoring. The pier and launch are publicly accessible areas of known use and contact with water. Monitoring sites are intended to be representative of potential recreational exposure routes.

Comment 26: “When discussing at length with City of Syracuse water dept., the stated use of this copper sulfate product, EarthTec, is stated to be for ‘last ditch emergency use only’ but this is not stated in the SPDES Permit as such- no specific guidelines for triggering action mentioned and no mention of using the company "Solitude Lake Management from Oneonta, NY, to administer when City officials request-this mechanism of both the methodology of calling an outside company within a restricted timeline in the middle of ‘HAB season’ to administer the correct dose (potentially toxic to humans and the lake ecosystem) needs to be carefully stated in the SPDES Permit.” (26)

Response 26: The triggers for pesticide treatment will be included in the pesticides management plan (PMP) that is required in the *Special Conditions: Pre-treatment Requirements* of the permit. These requirements have been updated to require the PMP to be submitted to NYSDEC prior to pesticide use.

Comment 27: “The outline of the 560 acre location in north basin of the lake on map, Fig.1, seems arbitrarily selected due to its relative location surrounding the City's intakes, based on the condition that microcystin's half-life is only a couple of days, according to City officials. However, when the most recent lake wide HAB occurred in 2017, the situation most agree would trigger ‘emergency use’ of such an algicide as EarthTec, the microcystins produced from all over the lake persisted and circulated for weeks/months, even after visible blooms had dissipated. Shouldn't scientific experts be consulted to better define these parameters prior to approving such arbitrary use of such a potentially toxic algicide?” (26)

Response 27: The City of Syracuse identified the potential treatment area as the critical area to protect the water supply intakes. This decision was based upon previous sampling for microcystin along the north shore and at the intakes to best quantify when there would be a correlation between the microcystin levels at the shore and the intakes. The City of Syracuse will be required to submit a PMP as discussed in Response 25. Responses 7 and 10 address concerns about the effectiveness of the treatment. Responses 1, 3, and 9 discuss the pesticide risk review and registration process.

Comment 28: “Since the City’s proposal is to apply EarthTec only to the north end of Skaneateles Lake, the result could well be damage to its ecosystem, with no remediation of blue-green algae in the rest of the lake. Why should the plant and animal life of the lake be harmed if blooms continue to affect the rest of the lake, where other drinking water

intake pipes exist? Our lake would end up worse off than before, with a damaged ecosystem and limited or nonexistent benefits to drinking water purity.

Although we understand the detrimental effects of cyanobacteria and microcystins, it does not make sense to destroy plant and aquatic life in Skaneateles Lake to yield safe drinking water — and there are reasons to question whether or not the City's plan would even be fully effective as proposed." (231)

Response 28: The stated purpose of this pesticide treatment is to protect the drinking water supply, not other uses of water in the lake. Responses 1, 4, and 8 discuss the use of EarthTec/copper sulfate pentahydrate for algal treatment and the potential effect on water quality. Response 10 addresses concerns about the effectiveness of the treatment.

At the proposed application rate for EarthTec as permitted by the FIFRA Section 2ee recommendation for EarthTec, which is lower than the approved application rates on the primary EarthTec label, NYSDEC does not anticipate non-target impacts from this treatment.

Comment 29: "One of my questions is, why does the permit request only up to two EarthTec applications to the full treatment area in a calendar year and at least 14 days between treatments in any treatment area? What damage or toxicity is the obvious concern here? Shouldn't this be specified by the applicant? The permit states also, 'Treatment must begin closest to the shore and proceed outward in bands to allow fish to move into untreated areas.' Is this to avoid massive fish kills? If so, what else does it affect, kill, or damage? And what will be the smell left to all the lakefront owners and the townspeople?

The permit states, 'Treatment shall immediately cease, and permit shall notify the New York State DEC if there are any visual evidence of biological impacts,' including these fish kills, 'during the treatment.' What is the incidence of such adverse effects using EarthTec, and how does it affect the dogs in the area of the lake and the children in the area of the lake? And how are you going to be able to notify every single lakefront owner that you're putting this chemical into our lake?" (272)

Response 29: The City of Syracuse indicated the desire to be permitted for 1-2 applications of the pesticide per year in the permit application. The EarthTec label requires the 14-day waiting period between treatments and instructs the applicator to begin treatment at the shore and move outward to allow fish to move into untreated areas.

Responses 4 and 28 discuss the risks to human and aquatic life. See Responses 5 and 11 for information about notifying property owners and lake users.

Comment 30: "Mary Torrisi had pointed out that the application progresses from the shore outward to encourage the fish to move out away from the affected area. Living on the waterfront, I live in an area designated on a fishing map as a prime fishing area at the mouth of a brook. I can tell you that the heavy fish concentration is probably within here100 feet of the shoreline there. Those fish are not going to move out. The fish are

going to be there. The consequences of the application of the pesticide will either be impacted in the fish that are caught or in the fish themselves." (273)

Response 30: NYSDEC does not anticipate any impacts to fish since the EarthTec label specifically addresses the requirements for the protection of fish. A certified applicator is required to follow the label directions during the treatment.

Response 10 discusses how EarthTec will be applied to the lake to protect the water supply.

F. Permit Details

Comment 31: "Too many 'loose ends and uncertainties' as current SPDES Permit is written: for example on page 3 under 'Facility Information', no mention of the first line of chlorination at the two in-lake City intakes, recently upgraded. Also, on the map, Fig.2, the 'Skaneateles pier' is incorrectly labeled at the DEC Boat Launch site, about two miles away from its actual location adjacent to the Village of Skaneateles bathing area." (26)

Response 31: See Response 20 for discussion of chlorine use. In response to this comment, Figure 2 has been removed, and Figure 1 has been updated to include corrected monitoring locations.

G. Aquatic Life Concerns

Comment 32: "In addition to the concerns expressed by the [Skaneateles Lake] Association we note the following:

1. The draft permit allows treatments at water temperatures of 60.8 F or higher in inshore waters. Rainbow trout will inhabit near shore areas at such water temperatures and are known to be acutely sensitive to copper sulfate. Chronic exposure to low levels of Earthtec (which may remain in suspension up to two weeks) may therefore cause delayed mortality in trout and other sensitive fish species. There is no provision in the draft permit for monitoring such potential mortality.
2. Treated lake waters will outlet to Skaneateles Creek, a popular trout stream stocked with rainbow trout. Trout in the stream will have no way to evade chronic exposure to copper sulfate. The draft permit does not address monitoring of possible impacts to Skaneateles Creek.
3. Treatment levels proposed in the draft permit are likely to kill zebra and quagga mussels now present in large densities in much of the lake. The visual monitoring of biological impacts only during application will not see impacts to these populations. There will be no way to judge if mortality is excessive...which would result in fouled water, smells and impacts on animal populations which utilize mussels for food and shelter.
4. There appear to be no studies done of native mussels, snails and other molluscs which could be present in the lake and be harmed by this application. Many native mussel species are classified as rare, endangered or of special concern in New York State." (210)

Response 32: The impacts of copper sulfate associated with trout has been documented in the Programmatic Environmental Impact Statement for the Aquatic Vegetation Control Program. This document recommends lowering the dosage rate of copper sulfate in trout

waters. The dosage rate for the proposed treatments in Skaneateles Lake is consistent with the lower dose recommended for trout waters and trout are not expected to be impacted. In addition, the pesticide label contains precautions to avoid impacts to fish.

EarthTec QZ, a similar pesticide product with the same active ingredient, has a New York State FIFRA 2ee recommendation for the control of zebra and quagga mussels. The application rate for zebra and quagga mussel control is higher than the approved application rate of the proposed permit. In addition, a higher concentration must also be maintained in the water for 14 days to control mussels, which will not be the case for the proposed HABs pesticide treatment; therefore, with the lower application rate, mussels are not expected to be impacted.

Copper sulfate pentahydrate is an effective pesticide to control snails; however, the application rate for snail control is much higher than the application rate in this proposed treatment; therefore, NYSDEC doesn't anticipate that there will be an impact on snails.

Comment 33: "Too many unknowns with this chemical - it's also listed as killing weeds like invasive milfoil as well as zebra mussels. What impact will the die off of these species in addition to the HAB release of toxins have on the ecosystem short and long term?" (76)

Response 33: Even though copper pesticide products can be used as a treatment for Eurasian watermilfoil, the application rate to control this species is higher than the proposed application rate for the HABs treatment; therefore, NYSDEC does not anticipate significant impacts to this vegetation. Response 31 addresses the concerns regarding impacts on zebra mussels.

H. Pesticides Management Plan

Comment 34: "A treatment plan for the lake is due only AFTER the SPDES permit is approved. Further, that plan does not have to undergo public review. While such actions may be legal under department regulations neither action seems appropriate for this high public interest project." (210)

Response 34: As stated in Response 1, EarthTec is registered as a pesticide and meets NSF American National Standard 60 for Drinking Water Treatment Chemicals. The application of the pesticide must be conducted by a certified pesticide applicator in accordance with the product label. The permit contains additional conditions, including the requirement that the permittee submit the PMP for NYSDEC review. Also see Response 33.

Comment 35: "On page 5...under 'special conditions' it states the City will develop the Pesticide Management plan, one month after the issuance of the permit and it will be kept 'inhouse'(not submitted). Do you feel the Skaneateles Lake shareholders can effectively comment without actually seeing the Pesticide Management Plan beforehand? What is the actual process and parameters for spraying, and is there anything you can share with regards to any draft Pesticide Management Plan? In the interest of transparency, why wouldn't the Pesticide Management Plan be submitted to the DEC beforehand? Wouldn't it be prudent for the plan to be submitted to DEC for review? Why keep it in house?" (220)

Response 35: The permit has been updated to require the permittee to submit the PMP to NYSDEC within one month of permit issuance. The PMP must be reviewed by NYSDEC prior to an application of EarthTec being authorized. Also see Response 32.

I. Support for the use of copper sulfate

Comment 36: “I am a family practice physician and a member of Skaneateles Lake Association, and I have a camp near Carpenter's Point. I'm a total newbie to this whole controversy, and my hats are off to Paul Torrisi and the talents and time that everyone's put into it. And I'm not opposing this; however, I'd like to make a little different gestalt on this whole thing.

I'm not a toxicologist or environmental expert, but I feel very safe with EarthTec when used as directed and discussed at the public information session held in October and hosted in part by Rich Abbott from the city of Syracuse. Again, as Paul mentioned, he discussed how Skaneateles Lake has been treated multiple times in the past with copper, probably at much greater concentrations than would be used. It's my understanding the various copper products are used in organic farming of fruit and vineyards. It's added to our vitamins. So you know, I don't know, but there are some things I am sure of.

I am sure that the toxins that are the degradation of products and blue-green algae are dangerous. BMAA is a neurotoxin produced by all green algae. In a couple of fascinating YouTube videos titled "KLS fishing for answers and diet in ALS," Dr. Michael Greger discusses reports about the concerns of their relationship to chronic neurologic disorders such as ALS, Alzheimer's and Parkinson's. In particular -- I wasn't going to mention this, but I think it's fascinating -- he relates a study of the indigenous peoples of a town in Guam where one-third of the population had severe and died from ALS, Parkinson's, dementia complex. They finally traced this to a blue-green algae that was growing in the roots of a tree that produced seeds that the bats were eating. And these people would have bat soup as part of their diet.

And he goes on to explore many other reports of these toxins being found in the brains of Alzhemier's patients where the presumed source across the country, across the world seems to be accumulation of BMAA in seafood. He discusses contamination of marine life in the Chesapeake Bay because of the algal blooms and basin flora where very high levels of this toxin are concentrated in marine life. Some of the things they tested had as high concentrations as those in the bats on Guam. So we do know they accumulate and concentrate in marine life.

What I do know and I am sure of is that my husband has been swimming in the lake for many, many years. And for the past few, he notices, as early as July, particulate matter in the water count that was never there before. What I know is my friend who routinely flies over all the involved finger lakes noted early August last year algal trails behind motor boats that stretch from Mandana to miles south. What I know is I just spent $11,000 drilling a 300-foot well at our Skaneateles camp because now I'm afraid to drink water directly from the lake. And we know HABs are only going to get worse, given our climate crisis. They're the devil we know versus one that is theoretical, copper sulfate.

I also don't know what the other options are. I do have a sense of urgency. And I understand Paul's point about releasing toxins, you know, with the treatment, but maybe it should be done prophylactically before the bloom and get more of a prophylactic program. But anyway, I actually wish they'd bring some of it down to my end of the lake because I'm nervous about it. That's my -- my concerns." (270)

Response 36: Comment noted.

J. Permit Opposition

Comment 37: "I'm a lawyer, resident of the Town of Skaneateles, a board member of the Skaneateles Lake Association, Inc. and we draw our water directly from the lake. Please consider this as a comment to the proposed application that legal action will be initiated to halt the proposed application because I believe it would harm water users and the lake ecology. Please respond to this comment." (222)

Response 37: Responses 1-4 and 7-10 address opposition to this permit, concerns about potential harm to human and aquatic health, and discuss benefits versus risk of pesticide treatment.

K. Public Comment Period Extension

Comment 38: "Given the technological difficulty citizens, including me, had connecting via last night's hearing, I'm respectfully asking that you consider extending the deadline for people to comment on the Permit Application. Thanks for your consideration!" (239)

Response 38: As discussed in Response 6, NYSDEC provided sufficient opportunity for public input via multiple venues and timeframes throughout the application process, all in accordance with the provisions of Uniform Procedure Act Regulations. Any technical difficulties, although unfortunate, did not preclude any individuals from providing written comments during the public notice and comment periods, including during the public hearing.

Comment 39: "Please see below a list of concerns in regards to optimizing public participation that is of great concern to the Skaneateles Lake Association re: stakeholder transparency and engagement. It is because of these concerns that the Skaneateles Lake Association requests an extension of the written public comment period and that a decision is made as soon as possible so that the community can be updated properly.

Public Participation concerns regarding City of Syracuse SPDES permit process:

1. As part of the initial Environmental News Bulletin on Jan 26, 2022 and at time when the Public Notice regarding the hearing was listed via Syracuse.com and the Press Observer, was all the pertinent registration information in place? It is our impression that webex registration instructions and the deadline to register to speak by 10 am on Feb. 28th was not established until sometime after the initial public notice was announced and possibly occurred less than 30 days from the Public Hearing date.
2. The instructions for the registration process while comprehensive was onerous for the public to engage with too many steps to follow that could have been reduced. Removing barriers to public engagement should always be at the forefront to facilitate a more meaningful democratic process.

3. There were individuals who:
    - registered but never received the link possibly due to company email filters.
    - registered and received the link to attend and then could not access via the webex platform.
    - called in and were unsuccessful at obtaining an opportunity to speak
    - on the webex had trouble navigating the ability to raise their hand
4. 30 days seems insufficient in advance of the hearing without all the details in place and should be extended based on the interest of this issue.
5. While not a requirement by DEC re: public notice, there is much disquietude in regards to very few communication outlets providing pertinent information beyond a post in the ENB, Syracuse.com, and efforts from the SLA and associated lake advocates.
6. Information or pertinent links were not found on the City of Syracuse Water Department's website nor via the Skaneateles Lake Municipal Watershed Partnership (The SWMP). The SWMP notes that the "website is an effort of the Skaneateles Watershed Municipal Partnership (SWMP), which is an initiative of the local watershed municipalities and organizational partners. Our goal is to work collectively to bring you the most up to date information regarding the Skaneateles Watershed and to work together to promote a healthy future for our beautiful water source." As of 1:30 PM on March 2, 2022 the website https://www.skanlakeinfo.org/algae-control still states the following: 'The NYS Department of Environmental Conservation has extended the hearing decision date to November 12, 2021 and the final permit decision to February 28, 2022...This website is supported by the City of Syracuse.'" (246)

Response 39: Uniform Procedure Act (UPA) Regulations, in addition to encouraging public input on permit applications before NYSDEC, are intended to ensure a fair and timely decision to permit or deny any actions governed by the statute. As such, the regulations provide certain timeframes in which a public hearing must be conducted as to not unduly delay decisions on those applications. Although difficulties associated with the virtual public hearing were unfortunately experienced by certain individuals, requirements of UPA as identified in 6 NYCRR 621.8 regarding conducting a public hearing were met, and to prolong the application process due to difficulties experienced by some is inconsistent with the intent of UPA to provide a fair and timely decision. NYSDEC is dedicated to enhancing transparency and public input through the application process under UPA, and these comments will be considered during the preparations of future public hearings.

Appendix A: Catalog of Commenters

Timely comments were received from:

	Affiliation	Name	Date
1	Skaneateles Lake Association	Frank H. Moses, Executive Director; Paul F. Torrisi, MD, Board President; W. "Buzz" Roberts, MD, Board Vice President; Joseph E. Grasso, MILR, Board Secretary; Richard D. Hole, Esq., Board Treasurer; Cornelius B. Murphy, Jr., PhD, Board Member; Fran Fish, RN, MS, Board Member – Membership Chair; James Tifft, MD, Board Member – Community Outreach & Education Chair; Dana Hall, PhD, Board Member – Watershed Improvement Chair	08/05/2022, 09/30/2022, 02/27/2022
2	Public Citizens	James and Deb Tifft	08/14/2021
3	Public Citizen	Raz Rahman	08/13/2021
4	Public Citizen	Carol Bryant	08/13/2021
5	Public Citizen	Ann Kilian	08/13/2021
6	Public Citizen	Laura Taber	08/13/2021
7	Public Citizen	Marlesha Minet	08/12/2021
8	Public Citizen	Elizabeth Moro	08/12/2021
9	Public Citizen	Elisabeth Wood	08/11/2021
10	Public Citizen	Anne Fouser	08/11/2021
11	Public Citizen	Kara Paro	08/10/2021
12	Public Citizen	Shannon Nierenberg	08/10/2021
13	Public Citizen	Louisa Cohlan	08/09/2021
14	Public Citizen	Gretchen Goffe	08/09/2021
15	Public Citizen	Marietta Bolster	08/09/2021
16	Public Citizen	Daniel Suits	08/09/2021
17	Public Citizens	Maureen and Brian Harkins	08/09/2021
18	Public Citizen	Brian Harkins	08/09/2021
19	Public Citizen	Jed Delmonico	08/09/2021
20	Public Citizen	JC Palermo	08/09/2021
21	Public Citizen	Janet Fairhurst	08/08/2021
22	Public Citizen	Maryann Cawley	08/08/2021
23	Public Citizen	Kuni Riccardi	08/08/2021
24	Public Citizen	Joseph Reagan, M.D.	08/08/2021
25	Public Citizen	Barbara Benedict	07/27/2021, 08/08/2021, and 03/01/2022
26	Public Citizen	Paul Torrisi	08/08/2021
27	Public Citizen	Tara Lynn	08/08/2021

28	Public Citizen	Kim Turner Howard	08/07/2021
29	Public Citizen	Judy Krieger	08/07/2021
30	Public Citizens	Dana and Susan Hall	08/07/2021
31	Public Citizen	Don Plath	08/07/2021
32	Public Citizen	Carolyn Schwab	08/07/2021
33	Public Citizen	Henry Beck	08/07/2021
34	Public Citizen	Larry Meeske	08/07/2021
35	Public Citizen	George Azzam	08/07/2021
36	Public Citizen	Hilary Fenner	08/07/2021
37	Public Citizen	Sara Strong	08/07/2021
38	Public Citizen	Lynn McLean	08/06/2021
39	Public Citizen	Jason Howarf	08/06/2021
40	Public Citizen	Elizabeth Edinger	08/06/2021
41	Public Citizen	Erin Taylor	08/06/2021
42	Public Citizen	Mike Yates	08/06/2021, and 02/28/2022
43	Public Citizen	Patty Torrey	08/06/2021
44	Public Citizen	Jane Cummings	08/06/2021
45	Public Citizen	Kelly Cummings	08/06/2021
46	Public Citizen	Jean Madigan	08/06/2021
47	Public Citizen	Gar Grannell	08/06/2021
48	Public Citizen	Francine Grannell	08/06/2021
49	Public Citizen	Duncan Wormer	08/06/2021
50	Public Citizen	Patricia Woodcock	08/06/2021
51	Public Citizen	Melissa Pavlus	08/06/2021
52	Public Citizen	Timothy and Elaine Rice	08/06/2021
53	Public Citizen	Jonathan Woodcock	08/06/2021
54	Public Citizen	Nancy Cihon	08/06/2021
55	Public Citizen	Tyndall Gary	08/06/2021
56	Public Citizen	Elan Salzhauer	08/06/2021
57	Public Citizen	Amanda Cooney	08/06/2021
58	Public Citizen	Ellen Compton	08/06/2021
59	Public Citizen	Cynthia Bright	08/06/2021, and 03/02/2022
60	Public Citizen	Cathy Fedrizzi	08/06/2021
61	Public Citizen	Jason Persse	08/06/2021
62	Public Citizens	Jason and Kim Persse	03/01/2022
63	Public Citizen	Kim Persse	08/06/2021
64	Public Citizen	Theresa Potenza	08/06/2021
65	Public Citizen	Scott Mcclurg	08/06/2021
66	Public Citizen	Peter Isler	08/06/2021
67	Public Citizen	Lindsay Kowalski	08/06/2021
68	Public Citizen	Meg Steele Wingerath	08/06/2021
69	Public Citizen	Robert Bellinger	08/06/2021
70	Public Citizen	Chelsea Leveille	08/06/2021
71	Public Citizen	Meryl Eriksen	08/06/2021, and 03/02/2022

72	Public Citizen	Jill Girzadas	08/06/2021
73	Public Citizens	Edwin and Pamela Ryan	08/06/2021
74	Public Citizen	Heather Bigness	08/06/2021
75	Public Citizen	Andree Mastrosimone	08/06/2021
76	Public Citizen	Amanda Snyder	08/06/2021
77	Public Citizen	Susan Dailey	08/06/2021
78	Public Citizen	Salvatore D'Amelio	08/06/2021
79	Public Citizen	Diana Green	08/06/2021
80	Public Citizen	Barb Root	08/06/2021
81	Public Citizen	Carol Shannon	08/06/2021
82	Public Citizen	Anne Salzhauer	08/06/2021
83	Public Citizen	James Tifft, M.D.	08/06/2021, and 03/02/2022
84	Public Citizen	Taylor Green	08/06/2021
85	Public Citizen	Robert Nichols	08/06/2021
86	Public Citizen	Rebecca Culbertson	08/06/2021
87	Public Citizen	Mary Torrisi	08/06/2021
88	Public Citizen	Anne McElroy	08/06/2021
89	Public Citizen	John MacAllister	08/06/2021
90	Public Citizen	Paul Leone	08/06/2021
91	Public Citizen	Alisa Salibra	08/06/2021
92	Public Citizen	Jeff Liccion	08/06/2021
93	Public Citizen	Kathleen ODonnell	08/06/2021
94	Public Citizen	Sharon Azzam	08/06/2021, and 03/02/2022
95	Public Citizen	Patricia Weisse	08/06/2021
96	Public Citizen	Stephen Weber	08/06/2021
97	Public Citizen	Mark McSwain	08/06/2021
98	Public Citizen	James Sheldon	08/06/2021
99	Public Citizen	Diane Emord	08/06/2021
100	Public Citizen	Thomas Wise	08/06/2021
101	Public Citizen	Michelle Mashia	08/06/2021, and 03/02/2022
102	Public Citizen	Michelle Ederer	08/05/2021
103	Public Citizen	Catherine King	08/05/2021
104	Public Citizen	Patrick MacDonald	08/05/2021
105	Public Citizen	Frances Rotunno	08/05/2021
106	Public Citizen	David Miller	08/05/2021
107	Public Citizen	Lisa Leesman	08/05/2021
108	Public Citizen	Gardner McLean	08/05/2021
109	Public Citizen	Tina Castle	08/05/2021
110	Public Citizen	Constance Brace	08/05/2021
111	Public Citizen	Robert Neumann	08/05/2021
112	Public Citizen	Robert Hunt	08/05/2021
113	Public Citizen	Douglas Allis	08/05/2021
114	Public Citizen	Lisa Rainey	08/05/2021
115	Public Citizen	Kathryn Coughlin	08/05/2021

116	Public Citizen	Forest Rittgers	08/05/2021
117	Public Citizen	Sara Buhl	08/05/2021
118	Public Citizen	Mary L. Gardner	08/05/2021
119	Public Citizen	William Warning	08/05/2021
120	Public Citizen	Curt Spalding	08/05/2021
121	Public Citizen	Bob Honold	08/05/2021
122	Public Citizen	John McDevitt	08/05/2021
123	Public Citizen	Katie Meyers	08/05/2021
124	Public Citizen	Helen Tai	08/05/2021
125	Public Citizen	Frances McCormack	08/05/2021
126	Public Citizen	Julie Scuderi	08/05/2021
127	Public Citizen	Douglas Murphy	08/05/2021
128	Public Citizen	Claire Howard	08/05/2021
129	Public Citizen	Lynne Gregory	08/05/2021
130	Public Citizen	Lisa Cartwright	08/05/2021
131	Public Citizen	Aster Weddings	08/05/2021
132	Public Citizen	Neal Houser	08/05/2021
133	Public Citizen	Caitlin Fields	08/05/2021
134	Public Citizen	Timothy ODonnell	08/05/2021
135	Public Citizen	Linda T. Cohen	08/05/2021
136	Public Citizen	Mary Torrisi	07/26/2021
137	Public Citizen	Andrew Paullin	07/25/2021
138	Public Citizen	Jane Cummings	07/26/2021
139	Public Citizen	Christine Delmonico	07/27/2021
140	Public Citizen	Kay Kraatz	07/27/2021, and 02/28/2022
141	Public Citizen	Donna Giambartolomei	07/28/2021
142	Public Citizen	Judith Freeman	07/29/2021
143	Public Citizen	David Jones	08/06/2021
144	Public Citizen	James Richardson	08/06/2021
145	Public Citizen	Shirley Eagan	08/21/2021
146	Public Citizen	Rose Gay	08/21/2021
147	Public Citizen	James Tuozzolo	08/21/2021
148	Public Citizen	Jeff LaMarca	08/12/2021
149	Public Citizen	Mary Hearn	08/11/2021
150	Public Citizen	Arnold Rubenstein	08/10/2021
151	Public Citizen	Susan Wulff	08/10/2021
152	Public Citizens	Diane and Mark Aberi	08/11/2021
153	Public Citizen	James Taylor IV	08/11/2021
154	Public Citizen	Patricia Carey	08/10/2021
155	Public Citizen	Audrey Van Voolen	08/12/2021
156	Public Citizen	Christina Castle	08/13/2021
157	Public Citizen	Mark Drastal	08/13/2021
158	Public Citizen	Bob Honold	08/13/2021
159	Public Citizen	Emily Konrad	08/13/2021
160	Public Citizen	Kristopher Konrad	08/14/2021
161	Public Citizen	Diane Maguire	08/14/2021

162	Public Citizen	Girard Purdy	08/14/2021
163	Public Citizen	Richard Ward	08/14/2021
164	Public Citizen	Cristy Winkelman	08/14/2021
165	Public Citizen	Edward McGraw	08/15/2021
166	Public Citizen	Lindsay Groves	08/18/2021
167	Public Citizen	John Formoza	08/26/2021
168	Public Citizen	Donna Hogan	08/26/2021
169	Public Citizen	Paul Torrisi Jr	08/06/2021
170	Public Citizen	Richard Haswell	08/10/2021
171	Public Citizen	Jessica Millman	08/10/2021
172	Public Citizen	Janet Winkelman	08/10/2021
173	Public Citizen	Sheila Haswell	08/10/2021
174	Public Citizen	Peter Babbles	08/11/2021
175	Public Citizen	Sarah Babbles	08/11/2021
176	Public Citizen	Brian Fischer	08/11/2021
177	Public Citizen	Kathleen Fischer	08/11/2021
178	Public Citizen	Leanna Fischer	08/11/2021
179	Public Citizen	Jean Babbles	08/12/2021
180	Public Citizen	Joseph Delmonico	08/12/2021
181	Public Citizen	Kimberly Alvarez	08/13/2021
182	Public Citizen	August Arroyo	08/13/2021, and 03/02/2022
183	Public Citizen	Elizabeth Etoll	08/13/2021
184	Public Citizen	Samir Mahadin	08/13/2021
185	Public Citizen	Roberta Ripberger	08/13/2021
186	Public Citizen	James Strodel	08/13/2021
187	Public Citizen	Neil Strodel	08/13/2021
188	Public Citizen	Patricia Troisi	08/13/2021, and 03/01/2022
189	Public Citizen	Susan Troup	08/13/2021
190	Public Citizen	Hadley Narins	08/14/2021
191	Public Citizen	Janet Stokoe	08/14/2021
192	Public Citizen	Richard Boni	08/15/2021
193	Public Citizen	Ellen Lutz	08/15/2021
194	Public Citizen	Joe Calipari	08/16/2021
195	Public Citizens	Terry and Bob DeWitt	08/16/2021
196	Public Citizen	Sheryl Szlosek	08/16/2021
197	Public Citizen	Wendy Maclachlan	08/18/2021
198	Public Citizen	Mary Gaffney	08/22/2021
199	Public Citizen	Unsigned	08/22/2021
200	Public Citizen	Scott Johnston	08/22/2021
201	Public Citizen	Jolie Johnston	08/22/2021
202	Public Citizen	Unsigned	08/22/2021
203	Public Citizen	Scott Moe	08/22/2021
204	Public Citizen	Rick Nicklas	08/22/2021
205	Public Citizen	Jennifer Tuozzolo	08/22/2021
206	Public Citizen	Karen Woodworth	08/22/2021

207	Public Citizen	Elizabeth Madden	08/23/2021
208	Public Citizen	Richard Tackley	08/18/2021
209	Public Citizen	Ellen Warner	08/05/2021
210	Central New York Chapter Izaak Walton League	Richard Preall	09/30/2021
211	Public Citizen	Nicki Danforth	09/11/2021
212	Public Citizen	Linda Pietroski	09/11/2021
213	Public Citizen	Melissa Zell	09/12/2021
214	Public Citizen	Fouad Dietz	09/13/2021
215	Public Citizen	Jayne Melrose-Smith	09/22/2021, and 09/26/2021
216	Public Citizen	John McDevitt	09/23/2021
217	Public Citizen	Fouad Dietz	09/16/2021
218	Public Citizen	Tom D'Amico	09/27/2021
219	Public Citizen	Tom Rhoads	09/24/2021
220	Onondaga County Legislator, District 6	Julie Abbott-Kenan	09/14/2021
221	Public Citizens	Tacie and Roland Anderson	02/27/2022
222	Public Citizen	Robert Liegel	02/28/2022
223	Public Citizen	Maeve Konrad	03/01/2022
224	Public Citizen	Tom McKeown	03/01/2022
225	Public Citizen	Christine Delmonico	03/01/2022
226	Public Citizen	Deborah Hole	03/01/2022
227	Public Citizens	Jane & Bill Cummings	03/01/2022
228	Public Citizen	Marybeth Carlberg	03/01/2022
229	Public Citizens	Marietta & Thomas Bolster	03/01/2022
230	Public Citizen	Carrie Conroy Ryan	03/01/2022
231	Public Citizens	Mary S. Hearn and Michael C. Hearn	03/01/2022
232	Public Citizens	Travis and Kate Ryan	03/01/2022
233	Public Citizen	James Richardson	03/01/2022
234	Public Citizen	Elizabeth Dreyfuss	03/02/2022
235	Public Citizens	A. Patrick Doyle and Elizabeth Downes	03/02/2022
236	CNY Compost	NA	03/02/2022
237	Public Citizen	Michael Bongiovanni	03/02/2022
238	Public Citizen	Amy Allyn	03/02/2022
239	Onondaga County Legislator, District 6	Julie Abbott	03/02/2022
240	Public Citizen	Susan Wulff	03/01/2022
241	Public Citizen	Jennifer Troisi	03/01/2022
242	Public Citizens	Seth & Lynn Thibault	03/02/2022
243	Public Citizen	Barbara Kelly	03/02/2022
244	Public Citizen	Katie Peck	03/02/2022
245	Public Citizen	Melissa Pavlus	03/02/2022

246	Skaneateles Lake Association, Executive Director	Frank Moses	03/02/2022
247	Public Citizen	David V. Miller	03/02/2022
248	Public Citizen	Brian Madigan	03/02/2022
249	Public Citizen	Katelyn & Luke MacDougall	03/02/2022
250	Public Citizen	Jeff LaMarca	03/02/2022
251	Public Citizen	Sherill Ketchum	03/02/2022
252	Public Citizen	Mary Morrissey Kerwick	03/02/2022
253	Public Citizen	Alan Johnson	03/02/2022
254	Public Citizen	Sidnie D'Amelio	03/02/2022
255	Former Town Councilor	Claire Howard	03/02/2022
256	Public Citizen	Nancy Peck	03/02/2022
257	Public Citizens	Molly and Todd Phillips	03/02/2022
258	Professor, Departments of Urology and Radiation Oncology Upstate Medical University	Oleg Shapiro, MD FACS	03/02/2022
259	Public Citizen	Carolyn Stafford	03/02/2022
260	Public Citizen	Megan Quinn Trombley	03/02/2022
261	Skaneateles Psychology Associates	Audrey H. Van Voolen, PhD	03/02/2022
262	Public Citizen	Phil Hider	02/28/2022
263	Public Citizen	Kathleen Morrissey	03/02/2022
264	Public Citizen	Richard Hole	03/01/2022
265	Public Citizen	Paul Torrisi	03/01/2022
266	Public Citizen	Julie Abbott	03/01/2022
267	Public Citizen	Frank Moses	03/01/2022
268	Public Citizen	Bob Honold	03/01/2022
269	Public Citizen	Louis Martin	03/01/2022
270	Public Citizen	Marybeth Carlberg	03/01/2022
271	Public Citizen	Jessica Millman	03/01/2022
272	Public Citizen	Mary Torrisi	03/01/2022
273	Public Citizen	Hamilton Fish	03/01/2022
274	Public Citizen	Victor Duniec	03/01/2022
275	Public Citizen	James Tifft	03/01/2022
276	Public Citizen	Virginia Calvert	03/01/2022
277	Public Citizen	Jack Riley	03/01/2022
278	Public Citizen	James Richardson	03/01/2022
279	Public Citizen	Kathleen Morrissey	03/01/2022
280	Public Citizen	Melissa Pavlus	03/01/2022

Appendix B: Commenters Letters Received

Winters, Catherine G (DEC)

From: dec.sm.DEPPermitting
Sent: Tuesday, August 10, 2021 2:24 PM
To: Hanson, Karyn D (DEC)
Subject: FW: SLA Opposes Premature Permitting of EarthTec use on Skaneateles Lake
Attachments: SLA Copper Sulfate Public Comment FINAL 8-5-21.pdf

Importance: High

FYI

From: Frank Moses <frank.moses.sla@gmail.com>
Sent: Thursday, August 05, 2021 7:50 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Cc: Abbott, Richard L. <RAbbott@syrgov.net>; mayor@villageofskaneateles.com; TrusteeEriksen <TrusteeEriksen@villageofskaneateles.com>; TrusteeLynn@villageofskaneateles.com; TrusteeEvans@villageofskaneateles.com; TrusteeZapata <TrusteeZapata@villageofskaneateles.com>; jaaron@townofskaneateles.com; Courtney Alexander <calexander@townofskaneateles.com>; kmccormack@townofskaneateles.com; mtucker@townofskaneateles.com; clegg@townofskaneateles.com; ckozub@townofspafford.com; chrisfesko52@gmail.com; htigh@townofspafford.com; jhinchcliff@townofspafford.com; cparsons@townofspafford.com; nilessupervisor@verizon.net; townsupervisor@townofscott.org; supervisor@marcellusny.com; tammy.sayre@outlook.com; lauriestev@aol.com; mstrong@cayugacounty.us; kfitch@cortland-co.org; Julie Abbott Kenan <julieabbottkenan@gmail.com>; mayor@syrgov.net; Travis Glazier <travisglazier@ongov.net>; Marko, Matthew J (DEC) <matthew.marko@dec.ny.gov>; Prestigiacomo, Anthony R (DEC) <Anthony.Prestigiacomo@dec.ny.gov>; Clinkhammer, Aimee C (DEC) <aimee.clinkhammer@dec.ny.gov>; Bill Hecht <wshecht01@gmail.com>; Buzz Roberts, M. D. <buzzroberts2@gmail.com>; Charles Driscoll, PhD <ctdrisco@syr.edu>; Dana Hall <danahall1701@gmail.com>; David Duggan <duggand@upstate.edu>; Deborah M. Hole <dhole@roadrunner.com>; Fran Fish <frotunno@verizon.net>; Gretchen Roberts <gretchengroberts@gmail.com>; J. D. Delmonico <jd@delmonicoinsurance.com>; James Tifft <jtifft@twcny.rr.com>; James Tuozzolo <JimTuozzolo@gmail.com>; Jed Delmonico <jed@delmonicoinsurance.com>; Jessica Millman <jessicacogan@yahoo.com>; Joseph E. Grasso <jeg68@cornell.edu>; cbmurphy@esf.edu; Patricia Orr <Porr56@yahoo.com>; Paul Torrisi <ptorrisi@me.com>; Richard D. Hole, Esq. <HoleR@bsk.com>; Rick Garrett <rgarrett@skanschools.org>; Robert DeWitt <rwd3038@aol.com>; Robert Liegel, Esq. <rgliegel@gmail.com>; William Dean, PhD <wddeaner@gmail.com>; Elizabeth D Liddy <liddy@syr.edu>; Awald, Joseph <JAwald@syrgov.net>; Loh, Greg <Gloh@syrgov.net>; glboyer@esf.edu; Michael Plochocki <michaelplochocki@ongov.net>; Jeffrey Till <JeffreyTill@ongov.net>; ryanmcmahon@ongov.net; Gretsky, Gavin <Gavin.Gretsky@mail.house.gov>; Liam Kirst <Liam@senatormannion.com>
Subject: SLA Opposes Premature Permitting of EarthTec use on Skaneateles Lake

Dear Ms. Hanson:

Please find attached the Skaneateles Lake Association's Public Comment re: the proposed use of EarthTec on Skaneateles Lake. Thank you for your consideration of our recommendations and requests. Also, below my signature is the full copy text of the signed letter on behalf of our board of directors.

Sincerely,

Frank

Frank Moses

Executive Director

Skaneateles Lake Association

frank.moses.sla@gmail.com

www.skaneateleslake.org

August 5, 2021

Karyn Hanson
NYSDEC Headquarters
625 Broadway
Albany, NY 12233

Re: Use of EarthTec (Active ingredient: Copper Sulfate 20%)

Skaneateles Lake Association Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Dear Ms. Hanson:

Position of opposition

The Skaneateles Lake Association (SLA), a not for profit established in 1969 to ensure the protection of Skaneateles Lake and its watershed, **strongly opposes at this time the New York State Department of Environmental Conservation (NYSDEC) permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake.**

Recommendation to postpone determination due to uncertainties and lack of reassurances

While SLA shares and respects the concern and responsibility to maintain public safety through the protection of drinking water**, there are currently too many uncertainties** regarding the treatment product and application protocols and **not enough well established reassurances** that are associated with the potential impact and use of the algicide. It is because of the uncertainties and lack of reassurances, **SLA requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community.**

Selection of EarthTec and associated uncertainties

On behalf of the concerned community, **SLA would request that more information be provided in regards to how EarthTec was selected as a suitable and effective product juxtaposed against other alternatives and inquire whether other treatment options, that are currently available and potentially permissible, were assessed.** There are **concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time**. There is also interest as to whether peroxide based treatments were assessed as well as other chelated copper sulfate algicides and whether EarthTec was determined to be most appropriate or was it just one of the only products looked into prior to submitting the permit application? Better understanding the parameters that aided in selection and assessment of EarthTec as a product may be beneficial in knowing what other alternatives have been possibly overlooked.

Also, at this time, there has been no success in procuring 3rd party or government based assessment of EarthTec as a product. **Having more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec** and not just literature provided by the company itself is a reasonable expectation in the assessment process. Earth Science Laboratories, Inc. reports that their product EarthTec "kills cyanobacteria without causing cell lysis", which is important due to the risk of additional microcystins being released from cell wall disruption. The SLA recommends that there be time for more government and 3rd party assessment of this report that is not based on the company claims or studies paid for by the company. This is an extremely important factor that would require more reassurance in a laboratory and mesocosm field tests with conditions similar to Skaneateles Lake.

There has been information provided showing that other municipalities use EarthTec at drinking water treatment plants, but none procured yet that depicts application into surface waters on a body of water with shoreline residents and recreational swimming. It also unclear as to whether the application of EarthTec on Skaneateles Lake is unprecedented in terms of surface water application on a body of water that is reservoir with a filtration avoidance waiver**. SLA recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application.**

While EarthTec is noted to meet NSF American National Standard 60 for Drinking Water Treatment Chemicals when applied beneath guidance thresholds, **what is unclear or unprovided at this point are the long term risks and threats not only to humans, but also to how the application of the product could impact the lake's ecosystem.**

SLA recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec.

Lack of Reassurances regarding Proposed Treatment Application and Protocols

With sufficient time allowed to more adequately determine whether or not EarthTec is properly assessed as being a suitable choice as a product to treat Microcystis cyanobacteria, what is equally important in tandem, is to **provide more details regarding the treatment protocol of applications and monitoring operations** so that the community confidence exists regarding necessary safeguards.

While the permit application provides information on thresholds, triggers, and cessation guidance, **it is not clear on how the treatment application is incorporated into a well-established and vetted emergency action plan.** The City of Syracuse Water Department has verbalized intentions related to the application of EarthTec as a last resort, emergency use

insurance policy that provides additional barriers in an overall plan, but there has not been provision of an implementation plan that includes a definition of the parameters of emergency use with various scenarios addressed. The development of this plan would be recommended before determination of use of EarthTec or other treatment systems would be recommended. The plan should include who makes what decision at which time based on what information, who the applicators are and what their safeguards are and what quality assurances exist to ensure proper application, what the plan is if for some reason the product is not applied correctly or in event of a product spill, ascertaining the efficacy of the treatment proposal all together if a lake wide bloom continues to populate the north end with a migrating south end source or in the event that microcystin toxins at dangerous levels are sustained beyond the permitted application allowance period and would require additional application, and what the responsibility is of the City of Syracuse, the impacted municipalities, and the greater community to ensure effective communications to eliminate any exposure to the product after its potential use.

Additionally, regarding the application of the proposed treatment system, **SLA recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake.**

It is a **more than reasonable expectation to see that the aforementioned is sufficiently addressed prior to determination of the use of EarthTec and/or other treatment systems.**

Insufficient impact evaluation process

Due to the history of introduction of copper sulfate and its existence in geology, **it is recommended that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake.**

In regards to monitoring impacts of EarthTec, it would be **recommended that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec.** Additionally, who's responsibility will it be to monitor the potential impacts?

SLA recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system.

Summary of Statements, Requests, and Recommendations

The Skaneateles Lake Association:

- **strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake.**
- **requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community.**
- **requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any.**
- **has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time.**
- **requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec**
- **recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application.**

- **requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem.**
- **recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec.**
- **recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations.**
- **requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan.**
- **recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake.**
- **recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake.**
- **recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec.**
- **recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system.**
- **recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed.**
- **requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application.**
- **requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.**

Conclusion

The SLA values the role the NYSDEC, City of Syracuse, and other governing entities provide in ensuring environmental and public safety. We are fortunate to currently have good working professionals that exude great care for our natural resources, but also realize that we may not be as fortunate in the future, thus we are **recommending more formalized assurances** to protect current and future generations and also allow enough time for the good working relationships to produce better certainty on the pathway in addressing the threat of harmful cyanobacteria. **SLA also reiterates our prior request to the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application.**

It is clear **since the onset of the major threat of harmful cyanobacteria blooms** that **there is a greater need for more stringent protections in our watershed enforced by the City of Syracuse in conjunction with the NYSDEC and NYS Department of Health.** We strongly advise that these protections occur in the future with better controls including, but not limited to development, adverse water-based activities, unchecked timber harvesting, and continuing to increase farming participation in best management practices. Finally**, SLA requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.**

Thank you for your strong consideration of the aforementioned.

Sincerely on behalf of the Board of Directors, Skaneateles Lake Association Inc.,

Skaneateles Lake Association, Inc.
P. O. Box 862 ▪ Skaneateles, NY 13152

August 5, 2021

Karyn Hanson
NYSDEC Headquarters
625 Broadway
Albany, NY 12233

Re: Use of EarthTec (Active ingredient: Copper Sulfate 20%)

Skaneateles Lake Association Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Dear Ms. Hanson:

Position of opposition

The Skaneateles Lake Association (SLA), a not for profit established in 1969 to ensure the protection of Skaneateles Lake and its watershed, **strongly opposes at this time the New York State Department of Environmental Conservation (NYSDEC) permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake.**

Recommendation to postpone determination due to uncertainties and lack of reassurances

While SLA shares and respects the concern and responsibility to maintain public safety through the protection of drinking water**, there are currently too many uncertainties** regarding the treatment product and application protocols and **not enough well established reassurances** that are associated with the potential impact and use of the algicide. It is because of the uncertainties and lack of reassurances, **SLA requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community.**

Selection of EarthTec and associated uncertainties

On behalf of the concerned community, **SLA would request that more information be provided in regards to how EarthTec was selected as a suitable and effective product juxtaposed against other alternatives and inquire whether other treatment options, that are currently available and potentially permissible, were assessed.** There are **concerns about the risks**

associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. There is also interest as to whether peroxide based treatments were assessed as well as other chelated copper sulfate algicides and whether EarthTec was determined to be most appropriate or was it just one of the only products looked into prior to submitting the permit application? Better understanding the parameters that aided in selection and assessment of EarthTec as a product may be beneficial in knowing what other alternatives have been possibly overlooked.

Also, at this time, there has been no success in procuring 3rd party or government based assessment of EarthTec as a product. **Having more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec** and not just literature provided by the company itself is a reasonable expectation in the assessment process. Earth Science Laboratories, Inc. reports that their product EarthTec "kills cyanobacteria without causing cell lysis", which is important due to the risk of additional microcystins being released from cell wall disruption. The SLA recommends that there be time for more government and 3rd party assessment of this report that is not based on the company claims or studies paid for by the company. This is an extremely important factor that would require more reassurance in a laboratory and mesocosm field tests with conditions similar to Skaneateles Lake.

There has been information provided showing that other municipalities use EarthTec at drinking water treatment plants, but none procured yet that depicts application into surface waters on a body of water with shoreline residents and recreational swimming. It also unclear as to whether the application of EarthTec on Skaneateles Lake is unprecedented in terms of surface water application on a body of water that is reservoir with a filtration avoidance waiver**. SLA recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application.**

While EarthTec is noted to meet NSF American National Standard 60 for Drinking Water Treatment Chemicals when applied beneath guidance thresholds, **what is unclear or unprovided at this point are the long term risks and threats not only to humans, but also to how the application of the product could impact the lake's ecosystem.**

SLA recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec.

Lack of Reassurances regarding Proposed Treatment Application and Protocols

With sufficient time allowed to more adequately determine whether or not EarthTec is properly assessed as being a suitable choice as a product to treat Microcystis cyanobacteria, what is equally important in tandem, is to **provide more details regarding the treatment protocol of applications and monitoring operations** so that the community confidence exists regarding necessary safeguards.

While the permit application provides information on thresholds, triggers, and cessation guidance, **it is not clear on how the treatment application is incorporated into a well-established and vetted emergency action plan.** The City of Syracuse Water Department has verbalized intentions related to the application of EarthTec as a last resort, emergency use insurance policy that provides additional barriers in an overall plan, but there has not been provision of an implementation plan that includes a definition of the parameters of emergency use with various scenarios addressed. The development of this plan would be recommended before determination of use of EarthTec or other treatment systems would be recommended. The plan should include who makes what decision at which time based on what information, who the applicators are and what their safeguards are and what quality assurances exist to ensure proper application, what the plan is if for some reason the product is not applied correctly or in

event of a product spill, ascertaining the efficacy of the treatment proposal all together if a lake wide bloom continues to populate the north end with a migrating south end source or in the event that microcystin toxins at dangerous levels are sustained beyond the permitted application allowance period and would require additional application, and what the responsibility is of the City of Syracuse, the impacted municipalities, and the greater community to ensure effective communications to eliminate any exposure to the product after its potential use.

Additionally, regarding the application of the proposed treatment system, **SLA recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake.**

It is a **more than reasonable expectation to see that the aforementioned is sufficiently addressed prior to determination of the use of EarthTec and/or other treatment systems.**

Insufficient impact evaluation process

Due to the history of introduction of copper sulfate and its existence in geology, **it is recommended that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake.**

In regards to monitoring impacts of EarthTec, it would be **recommended that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec.** Additionally, who's responsibility will it be to monitor the potential impacts?

SLA recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system.

Summary of Statements, Requests, and Recommendations

The Skaneateles Lake Association:

- **strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake.**
- **requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community.**
- **requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any.**
- **has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time.**
- **requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec**
- **recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application.**

- **requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem.**
- **recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec.**
- **recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations.**
- **requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan.**
- **recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake.**
- **recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake.**
- **recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec.**
- **recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system.**
- **recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed.**
- **requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application.**
- **requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.**

Conclusion

The SLA values the role the NYSDEC, City of Syracuse, and other governing entities provide in ensuring environmental and public safety. We are fortunate to currently have good working professionals that exude great care for our natural resources, but also realize that we may not be as fortunate in the future, thus we are **recommending more formalized assurances** to protect current and future generations and also allow enough time for the good working relationships to produce better certainty on the pathway in addressing the threat of harmful cyanobacteria. **SLA also reiterates our prior request to the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application.**

It is clear **since the onset of the major threat of harmful cyanobacteria blooms** that **there is a greater need for more stringent protections in our watershed enforced by the City of Syracuse in conjunction with the NYSDEC and NYS Department of Health.** We strongly advise that these protections occur in the future with better controls including, but not limited to development, adverse water-based activities, unchecked timber harvesting, and continuing to increase farming participation in best management practices. Finally**, SLA requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.**

Thank you for your strong consideration of the aforementioned.

Sincerely on behalf of the Board of Directors, Skaneateles Lake Association Inc.,

Frank H. Moses
Executive Director

Paul F. Torrisi, MD
Board President

W. "Buzz" Roberts, MD
Board Vice President

Joseph E. Grasso, MILR
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Richard D. Hole, Esq.
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James Tifft, MD
Board Member – Community Outreach & Education Chair

Dana Hall, PhD
Board Member – Watershed Improvement Chair

Cc: City of Syracuse Mayor Ben Walsh; City of Syracuse Water Department Commissioner Joseph Auwald; City of Syracuse Watershed Quality Coordinator Rich Abbott; City of Syracuse Chief Policy Officer Greg Loh; Village of Skaneateles Mayor Mary Sennett; Village of Skaneateles Trustee Gregg Eriksen; Village of Skaneateles Trustee Tara Lynn; Village of Skaneateles Trustee Ed Evans; Village of Skaneateles Trustee Kathleen Zapata; Town of Skaneateles Supervisor Janet Aaron; Town of Skaneateles Councilor Courtney Alexander; Town of Skaneateles Councilor Kevin McCormack; Town of Skaneateles Councilor Mark Tucker; Town of Skaneateles Councilor Chris Legg; Town of Spafford Supervisor Christopher Kozub; Town of Spafford Councilor Christine Fesko; Town of Spafford Councilor Hannah Tigh; Town of Spafford Councilor John Hinchcliff; Town of Spafford Councilor Charles Parsons; Town of Niles Supervisor Joan Jayne; Town of Niles Councilor Steven Cuddeback; Town of Niles Councilor

Clarence Edmonds; Town of Niles Councilor Bernard Juli; Town of Niles Councilor Joseph MacDuffee; Town of Scott Supervisor Guy Ruoff; Town of Scott Councilor Paula Arnold; Town of Scott Councilor Louis Martin; Town of Scott Councilor Trevor Adams; Town of Scott Councilor Neeca Root; Town of Sempronius Supervisor Kevin Court; Town of Sempronius Councilor Joanne Andersen; Town of Sempronius Councilor George Glover; Town of Sempronius Councilor Herrick Kimball; Town of Sempronius Councilor John Bell; Cayuga County Legislator Mark Strong; Cortland County Legislator Kevin Fitch; Onondaga County Executive Ryan McMahon; Onondaga County Legislator Julie Abbott-Kenan; Onondaga County Office of the Environment Director Travis Glazier; Onondaga County Director of Clean Water Initiatives Mike Plochocki; New York State Assemblyman John Lemondes; New York State Senator John Mannion; New York State Senator Peter Oberacker; US Senator Chuck Schumer; US Senator Kirsten Gillibrand; US Representative John Katko; US Representative Tom Reed; NYSDEC Region 7 Director Matthew Marko; NYSDEC Finger Lakes Program Staff; NYSDEC Commissioner Basil Seggos

Skaneateles Lake Association, Inc.
P. O. Box 862 · Skaneateles, NY 13152

September 30, 2021

Karyn Hanson
NYSDEC Headquarters
625 Broadway
Albany, NY 12233

Re: SLA Updated Comment on Use of EarthTec (Active ingredient: Copper Sulfate 20%)

Skaneateles Lake Association Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Dear Ms. Hanson:

Please consider this letter as an update to and reaffirmation of the public comment letter submitted to the NYSDEC by the Skaneateles Lake Association (SLA) on August 5, 2021.

Restatement of Opposition

The SLA still remains in opposition at this time re: EarthTec being permitted by the NYSDEC as a Harmful Algal Bloom (HAB) treatment option on Skaneateles Lake by the City of Syracuse or any affiliates due to a continuation of too many uncertainties and not enough reassurances regarding EarthTec and its potential use.

The "statements, requests, and recommendations" summarized at the end of the enclosed SLA's August 5th letter still remain of significant importance regarding the assessment of EarthTec and the abatement of HABs.

SLA does appreciate and acknowledges that a few of the requests have partly been addressed in regards to 1) holding a public information meeting; 2) postponing determination to allow for further exploration; and 3) the City of Syracuse providing some historical copper data to local experts.

Response Re: Public Information Meeting

The SLA values that the request to hold a public information meeting hosted by the City of Syracuse with participation from the NYSDEC and EarthTec representatives was responded to. While it is understood that scheduling of the meeting hosts and presenters was a factor, having one meeting session at noon during the work week may have not been the most ideal time to engage the community. The opportunity to further engage and inform the community by providing a recording of the meeting prior to the end of the public comment period on October 1, 2021 was expected and did not occur.

Additionally, some of the information provided by representatives of EarthTec during the meeting created some confusion in regards to the safety of the product when applied. The SPDES Permit Fact Sheet NY 0300004 notes microcystin as a by-product to the application of EarthTec and mentions "additional oversight and monitoring to ensure the safety of the public who recreate in the lake." The fact sheet also notes monitoring at public bathing areas, but does not call for a provision to monitor additional areas where private homeowners recreate as well. Lastly, a representative from EarthTec noted at the public information meeting that it would be safe to swim and drink water immediately after EarthTec was applied to the water. The aforementioned observations in addition to the EPA's Master Label warnings stating to avoid contact and ingestion and to use personal protective equipment when using causes even more uncertainty regarding the use of EarthTec.

The public information meeting was helpful in regards to the overview of timeline and information provided by the NYSDEC and with the City of Syracuse's pledge that the use of the product is viewed similarly to a life insurance policy and that it is for emergency last resort use. Beyond that, the meeting did not seem to address many concerns outlined in SLA's August 5th letter and did not engage other scientific experts that are not affiliated so closely with the EarthTec chemical company.

Response Re: Permit Determination Timeline and Request for a specific SPEDES Permit and Public Hearing

SLA recommends that the NYSDEC requires a public hearing regarding the use of EarthTec. Additionally, SLA requests that the determination timeline be extended beyond February 2022 to allow for further assessment.

Establishing a Baseline for Copper Data in Skaneateles Lake Sediment and Adherence to NYSDEC's 1999 "Technical Guidance for Screening Contaminated Sediments"

The sediment quality of Skaneateles Lake is very important in establishing the health of the Lake ecosystem. Has NYSDEC reviewed the following NYSDEC technical guidance document and sediment quality information in the process of evaluating the EarthTec product proposed to be applied to Skaneateles Lake?

" Technical Guidance for Screening Contaminated Sediments " NYSDEC 1999

This document defines the maximum contaminant content of sediments that is protective of human health and the protection of aquatic and benthic organisms and wildlife.

In this context was historical sediment data reviewed relative to copper concentrations and potential need to acquire sediment sample and determine the current baseline for the concentration of copper in the sediments?

The NYSDEC 1999 document is very clear in recommending a LEL (Lowest effects level) of 16 mg/Kg dry weight and a SEL (Severe effects level) of 110 mg/Kg dry weight level.

It is expected that a large portion of the copper sulfate applied to the northern part of the lake would wind up in the sediments. It is very important to understand what the current copper sediment concentrations are and to what degree the introduction of the Earth Tech product will increase their concentration in the sediment.

It is our opinion that the regulatory agency (NYSDEC) has a responsibility to conduct this evaluation using its own guidance prior to approving the use of this EarthTec product in the direct treatment of the lake water. Skaneateles Lake is an Extraordinary natural resource and deserves this standard of care.

Conclusion

SLA truly values the City of Syracuse and NYSDEC's willingness to further explore and assess viable and sensible solutions toward treating HABs and expects great care in future decision making as it impacts the quality of drinking water and quality of life that Skaneateles Lake continues to provide the local and regional communities. Thank you for considering the aforementioned and the previous August 5th public comment letter below.

Sincerely on behalf of the Board of Directors, Skaneateles Lake Association Inc.,

Frank H. Moses
Executive Director

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Board President

W. "Buzz" Roberts, MD
Board Vice President

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Dana Hall, PhD
Board Member – Watershed Improvement Chair

Skaneateles Lake Association, Inc.
P. O. Box 862 · Skaneateles, NY 13152

February 27, 2022

Karyn Hanson
NYS DEC – Division of Environmental Permits
625 Broadway, 4th Floor
Albany, NY 12233-1750

Re: SLA Updated Comment Re: Public Hearing on Draft Permit Application for EarthTec (Active ingredient: Copper Sulfate 19.8%)

Skaneateles Lake Association Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Dear Ms. Hanson:

Please consider this letter as an update to and reaffirmation of the public comment letters submitted to the NYSDEC by the Skaneateles Lake Association (SLA) on September 30, and August 5, 2021 (Appendix A).

Opposition to use of EarthTec still remains due to uncertainties and lack of reassurances

The **SLA still remains in opposition** at this time re: EarthTec being permitted by the NYSDEC as a Harmful Algal Bloom (HAB) treatment option on Skaneateles Lake by the City of Syracuse or any affiliates.

For varying reasons outlined below and in more detail in previous written comments submitted to the NYSDEC, SLA considers the **permit application insufficient in detail leading to too many uncertainties along with a lack of reassurances to the community** regarding the proposed use of the algicide EarthTec.

Beyond the insufficiencies relevant to the permit application additional concerns related to the use of EarthTec include:

- Possible **ineffectiveness of proposed EarthTec application** to the lake surface only on the north end region of the lake during a lake wide algal bloom event with some sets of intake pipes being deeper in the water column.
- **Absence of an operations, maintenance, and monitoring plan** associated with the proposed treatment system. City of Syracuse noted in the application that a pesticide management plan would be provided AFTER permit approval.

- **No example provided showing use of product on reservoirs similar to Skaneateles Lake with a filtration avoidance waiver** has resulted in interpreting **use of EarthTec as "experimental"**.
- **Evidence of copper levels in lake sediment already at unacceptable levels** requiring further evaluation from NYSDEC re: **possible negative impacts on aquatic life**. Assessment should be conducted prior to any consideration of the use of EarthTec that could potentially add more copper into Skaneateles Lake.

The comments provided in the September 30, 2021 letter and the "statements, requests, and recommendations" summarized at the end of the enclosed SLA's August 5th letter still remain of significant importance regarding the assessment of EarthTec environmental impacts and the effectiveness in the abatement of HABs.

Acknowledgement of NYS DEC response to require a Public Hearing

As was requested in the September 30, 2021 letter, SLA appreciates the decision being made to conduct a Public Hearing, but also considers that the **additional time allotted to further assess** the uncertainties and lack of reassurances as highlighted in previous comment letters has been **insufficient in addressing SLA's concerns.**

Continued and increased concerns relevant to past comment letters

Efficacy of EarthTec treatment - Upon further review of the draft application to use EarthTec, **SLA questions the effectiveness of treatment of Harmful Algal Blooms with EarthTec** during a lake-wide event when treatment would only be applied to the northern end of the lake. Additionally, it is **questionable as to whether the surface application of the EarthTec product would effectively treat harmful cyanobacteria that is deeper in the water column** near some of the City of Syracuse intake pipes.

Request for adequate evaluation – SLA continues to request that:

- Potential **long-term impacts** on aquatic and human life from existing levels of copper **be considered and evaluated** by scientists not affiliated with the EarthTec parent company.
- **NYSDEC bases decision** to allow adding more Copper via the active ingredient in EarthTec **on existing copper levels in sediment.,**
- **Require a comprehensive plan** for monitoring potential impacts from proposed treatment solution to be provided **in advance of permit authorization.**

In the September 30, 2021 comment letter, SLA requested that a baseline be established for Copper levels prior to considering additional copper. Associated with that request was the inquiry as to whether the NYS DEC would adhere to its 1999 publication titled "Technical Guidance for Screening Contaminated Sediments".

Since the requests were made, SLA was able to review the June 24, 2014 NYS DEC document titled "Screening and Assessment of Contaminated Sediment" and learned more from a past DEC commissioned 2001 study re: Copper levels as well as reviewed additional sediment data provided by Syracuse University. In the screening and assessment document, it indicates that **sediments containing Copper at levels between 32 and 150 mg/kg initiate guidance where "additional testing is required to evaluate the potential risks to aquatic life."**

Data from the NYS DEC's July 2001 "Water Quality Study of the Finger Lakes", authored by Clifford W. Callinan, P.E., noted a **peak level of copper at 78 ppm or mg/kg on Skaneateles Lake**.

Preliminary Syracuse University core sediment data results indicate:

Sediments (124 samples analyzed)

- 94 of the 124 samples analyzed had greater than 32 mg/kg of copper (suggesting Class B levels)
- Min – 6.6 mg/kg
- Max – 105.4 mg/kg
- Avg 47.1 mg/kg
- Stdev – 21.61 mg/kg

Has the NYS DEC conducted additional testing to evaluate potential risks to the aquatic life based on Skaneateles Lake already having unacceptable levels of copper in its sediment? This would be extremely important prior to potentially permitting the addition of more copper-based products.

There is also **additional concern** based on the review of a study titled "Side Effects of 58 Years of Copper Sulfate Treatment of the Fairmont Lakes, Minnesota" by Mark J. Hanson and Heinz G. Stefan **noting long term impacts of Copper Sulfate** "including: **a) copper accumulation in the sediments, b) tolerance adjustments of certain species of algae to higher copper sulfate dosages, c) shift of species from green to blue-algae and from game fish to rough fish, d) disappearance of macrophytes and e) reductions in benthic Macroinvertebrates.**

These concerns combined with the lack of information as to whether the EarthTec product has been applied to other surface waters of drinking water reservoirs having a filtration avoidance waiver **still calls for SLA's opposition to its use in Skaneateles Lake.**

Conclusion

Thank you again for providing more opportunities for SLA and the community to voice concerns. In addition to the comments above, please review our previous written comments from September 30 and August 5, 2021 (enclosed below) that still represent our main concerns. Please find below a summary of those concerns:

Summary of Statements, Requests, and Recommendations

The Skaneateles Lake Association:

- **strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake.**
- **requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community.**
- **requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any.**
- **has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time.**

- **requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec**
- **recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application.**
- **requests information on the long-term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem.**
- **recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec.**
- **recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations.**
- **requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan.**
- **recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake.**
- **recommends that a baseline of copper in the existing sediment be established and be evaluated for negative short and long term impacts on aquatic life prior to any potential further introduction into Skaneateles Lake.**
- **recommends that the NYSDEC adhere to its own established guidance when making a decision to allow for the use of EarthTec on Skaneateles Lake in regards to existing levels of copper in sediment.**
- **recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec.**
- **recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system.**
- **recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed.**
- **requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.**

Sincerely on behalf of the Skaneateles Lake Association,

Frank H. Moses
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Board Member – Watershed Improvement Chair

Charles T. Driscoll, PhD
Board Member

William Dean, PhD
Board Member
Lake Ecology Team Co-Chair

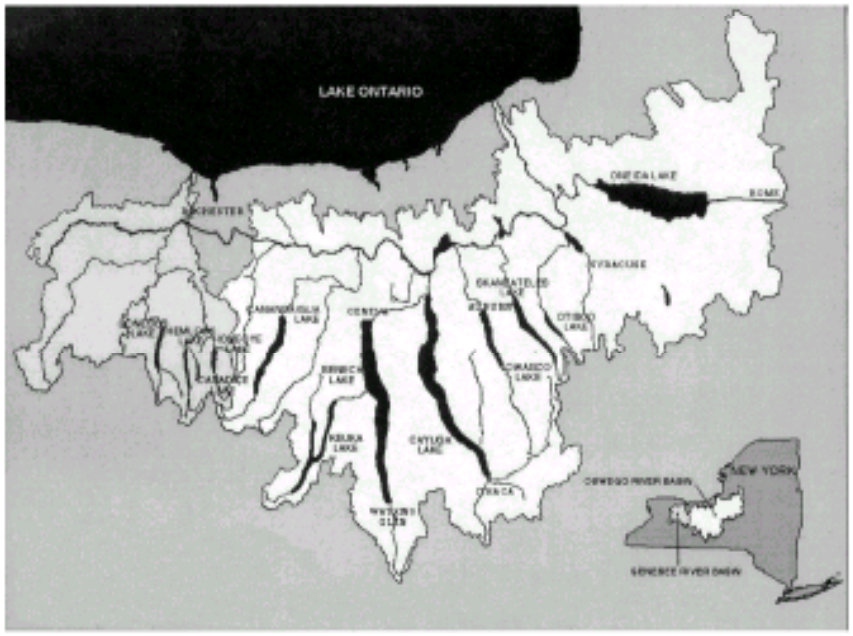
New York State

DEC

Division of Water

Water Quality Study of the Finger Lakes

July 2001



New York State Department of Environmental Conservation

George E. Pataki, *Governor*

Erin M. Crotty, *Commissioner*

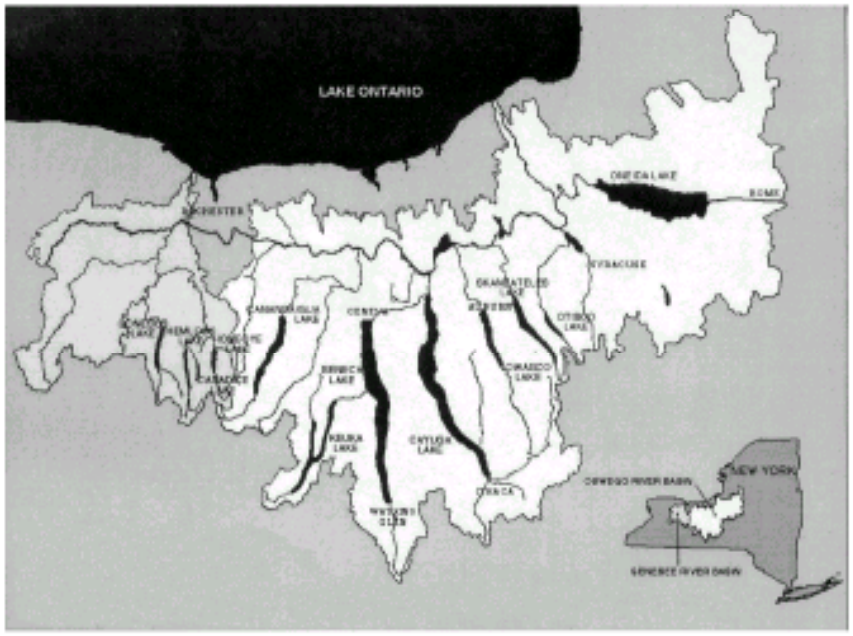
New York State

DEC

Division of Water

Water Quality Study of the Finger Lakes

July 2001



New York State Department of Environmental Conservation

George E. Pataki, *Governor*

Erin M. Crotty, *Commissioner*

NASA 1991 Landsat Infrared Image

Water Quality Study of the Finger Lakes

Author: Clifford W. Callinan, P.E.

Date: July 2001

New York State Department of Environmental Conservation

Acknowledgements

As is often the case in a study such as this, certain hurdles must be overcome if the project is to be successful. This study was certainly no exception to the rule. Most notable of these hurdles was the coincidence of the later portion of the sediment core investigation with one of the largest tornado outbreaks in New York State history. On June 2, 1998 while sampling Canadice Lake the field crew came within a mere few miles of one of these storms. In fact, severe thunderstorm activity in the area resulted in the loss of our initial sediment core from Canadice Lake when a significant wind gust toppled the core as it rested on shore.

The Sediment Core Investigation would not have been possible without the significant efforts of Bruce Garabedian and Chandler Rowell of the NYSDEC; Hank Mullins and Chris Lajewski from Syracuse University; Ron Pause of the NYSDOH; and Mike Perry from Columbia Analytical Services. I would also like to extend my appreciation to Dick Draper, Frank Esterbrooks, Ron Sloan, and Karen Woodfield from the NYSDEC; as well as John Halfman from Hobart and William Smith College; Fred Luckey of the USEPA, and Dick Yager of the USGS for their assistance in this portion of the project.

The Synoptic Water Quality Investigation was also not immune to the erratic weather patterns in this picturesque part of New York State. While Skaneateles Lake is one of the most majestic waterbodies in the Empire State, it's weather patterns can be down right confounding. We were forced to seek safe harbor during several sampling excursions on Skaneateles Lake. Most notable of these episodes occurred on August 8, 1996, when an intense thunderstorm of approximately 3-4 hours duration stalled over the northern end of Skaneateles Lake and caused us to beat a hasty, and premature, retreat from the lake. My advice to all who venture onto this magnificent body of water is to always keep an eye to the sky.

The Synoptic Water Quality Investigation, which is continuing at present, is also a collaborative undertaking, and would not be possible without the considerable efforts of Scott Cook and Matt Romocki from NYSDEC Region 7 Water; Denise Richardson, Webster Pearsol, Gene Lane, and Dan Mulhul from NYSDEC Region 8 Fisheries; and Steve Effler, Carol Brooks, Bruce Wagner, and Nicholas Ohrazda of the Upstate Freshwater Institute – who provided significant assistance with the inception of this study. I would also like to thank Bill Abraham, Jay Bloomfield, Robert Bauer, Steve Eidt, Ricardo Lopez-Torrijos, Chris O'Connor, Tom Pearson, Howard Pike, and Les Wedge, of the NYSDEC; Ed Bugliosi, Dave Eckhardt, and Bill Kappel of the USGS; Ed Mills of the Cornell Biological Field Station; Larry Eichler from the Darrin Freshwater Institute; and Terry Faber of the USEPA for their assistance in this investigation.

Finally, I would like to thank my daughters, Nora and Caitlin, and my wife Amy for their insightful questions during the writing of this report. Their insistence on a recitation of the day's events, and a clear explanation of findings, prompted significant thought and revision of this report. For example, the glossary for this report is largely an outgrowth of their inquiries.

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Chapter 1: Executive Summary

The Finger Lakes are a series of 11 freshwater lakes located in the western part of New York State. The lakes were formed by glacial activity which ended approximately 10,000 years ago. The Finger Lakes include 3 of the largest 10 lakes in the New York State, and represent a significant asset to the Finger Lakes Region and the Empire State in general. All of the lakes, with the exception of Honeoye Lake, are used for public water supply. Permitted water withdrawals total approximately 180 million gallons per day. The Finger Lakes Region is also a well known tourist destination and generates an estimated $1.5 billion annually. The lakes and surrounding landscape of the region are a primary focus for tourism activity.

Water quality conditions within the Finger Lakes are generally good. However, there are water quality concerns as reflected by the fact that all 11 of the lakes are currently on the New York State Department of Environmental Conservation (NYSDEC) Priority Waterbodies List. Water quality issues of concern within the Finger Lakes are approximately equally split between water supply, swimming, and fish consumption issues. Pollutants of concern include nutrients, sediments, priority organics, pathogens, and salts.

Watershed management activities are underway in all 11 of the Finger Lakes watersheds. Management activities vary in level of complexity and stages of development. Canandaigua Lake and Keuka Lake are furthest along the watershed management continuum and have, to a degree, acted as a guide for management activities within several of the other Finger Lakes.

The Finger Lakes have been studied sporadically for nearly a century. The lakes were the focus of pioneering limnological studies by Birge and Juday during the early part of the 20th century. Following this initial foray, there would be a rather lengthy hiatus of nearly half a century before a comprehensive assessment of the lakes would occur. This later effort was conducted by a group of academicians, and culminated in publication of Lakes of New York State – Ecology of the Finger Lakes. Since the early 1970s, little systematic study of water quality conditions within the Finger Lakes has occurred, until the current investigation. There have been monitoring activities on a number of specific Finger Lakes over this time frame – these are largely locally-driven efforts focused on a single lake. However, comparative investigations of the Finger Lakes have been absent over the past several decades.

The purpose of the current study is to conduct such comparative investigations and to assess water quality conditions and trends within the Finger Lakes. The study is composed of two distinct components, *Synoptic Water Quality Investigation* and *Sediment Core Investigation*. The Synoptic Water Quality Investigation is designed to assess current limnological conditions, and to evaluate water quality trends within this important set of lakes. This portion of the Study was initiated in 1996 and is continuing at present. The Sediment Core Investigation is designed to assess chemical trends within the Finger Lakes over time. This portion of the Study is designed as a one-time effort, and sample collection occurred between 1997 and 1998.

The Synoptic Water Quality Investigation involves the collection of water samples and vertical water column profiles at a single deep water location within each lake – the only exception is for Cayuga Lake where there are 3 monitoring locations. Samples from both the epilimnion and hypolimnion are collected monthly during the growing season. In addition, vertical profiles of temperature, dissolved oxygen, pH, and conductivity are collected during each sampling run. The primary focus for this portion of the study is to assess the current trophic status of the lakes and evaluate trends in trophic indices. A secondary focus of the investigation is to assess the status and trends for major ions in the lakes.

Trophic conditions within the Finger Lakes, as reflected in conventional trophic indicators (total phosphorus, chlorophyll *a*, and Secchi Disk depth), have fluctuated significantly over the past century. Trophic conditions are thought to have increased significantly in most of the lakes between the early 1900s and the early 1970s, as evidenced by a marked decline in water clarity levels in most of the lakes. This increase in trophic state, generally considered undesirable, was likely the result of increased phosphorus loading to the lakes over this timeframe – phosphorus is the limiting nutrient within the Finger Lakes. The trend in trophic conditions from the early 1970s to present are somewhat less uniform. In general, the *larger* Finger Lakes have exhibited moderate to substantial declines in trophic state, while trophic conditions within the *smaller* lakes have remained static or increased moderately. The declines in trophic state observed in the larger lakes are believed the result of environmental management actions (e.g., phosphate detergent ban, construction of wastewater facilities, implementation of best management practices, etc.) implemented over the last several decades. Given that these management actions are not unique to the larger lake basins, raises the question "*why are the smaller lakes not responding accordingly*?". This apparent dichotomy in system response is thought to be the result of differences in hypolimnetic dissolved oxygen levels between the larger and smaller lakes, and resultant differences in phosphorus cycling within the respective lakes. It is believed that dissolved oxygen depletion in the smaller lakes trigger an internal release of phosphorus from lake bottom sediments, which, in effect, compensates for realized phosphorus load reductions from the watershed. This is consistent with dissolved oxygen observations in that the larger lakes exhibit little oxygen depletion with depth during the growing season, while the smaller lakes exhibit significant dissolved oxygen depletion during the summer months. The hypolimnion of a number of the Finger Lakes (Otisco, Honeoye, Canadice, Hemlock, and Conesus Lakes) drop below existing dissolved oxygen criteria. Furthermore, New York State's total phosphorus guidance value of 20 ug/l is exceeded in Conesus and Honeoye Lakes, as well as in the southern terminus of Cayuga Lake in certain years.

A secondary focus of the Synoptic Water Quality Investigation is to assess the status and trends for major ions within the Finger Lakes. Findings indicate that water column concentrations of certain ions within the Finger Lakes have changed somewhat over the past 3 decades. *First*, sodium and chloride levels have declined significantly in the two largest lakes (Seneca and Cayuga Lakes), while trends for these ions in the other Finger Lakes indicate increasing concentrations. Sodium and chloride levels have historically been much higher in Seneca and Cayuga Lakes than in the other Finger Lakes, likely due to the proximity of these deep lake basins to underlying salt strata and/or mining operations in the areas. This differential remains the case today, however the gap has narrowed somewhat. The increases in sodium and chloride levels observed in the other Finger Lakes are likely the result of increased use of deicing agents (e.g., sodium chloride) within the watersheds. With respect to water quality concerns, the sodium levels in both Seneca Lake and Cayuga Lake remain above water supply criteria (20 mg/l) for those on severely restricted sodium diets, and the levels within Conesus Lake are approaching this level. *Second*, calcium levels have increased within several of the Finger Lakes over the past few decades, which may raise concerns about Zebra mussel infestations. Zebra mussels, an exotic bivalve introduced into the US in the late 1980s, can cause substantial disruption to aquatic ecosystems, and result in significant impacts to human-made structures (e.g., clogging of water intake pipes). Calcium is often the limiting nutrient to Zebra mussel productivity and growth, thus increased calcium concentrations may lead to an exacerbation of Zebra mussel impacts. It is interesting to note that as of this time Zebra mussels have been found in all of the Finger Lakes with the exception of Canadice Lake. Furthermore, the lowest calcium levels observed in the Finger Lakes are in Canadice Lake, and occur at levels believed to inhibit establishment of Zebra mussel populations. However, given that calcium levels appear to be increasing in Canadice Lake, it is probable that Zebra mussels will eventually become established within the lake. *Third*, alkalinity levels within several of the Finger Lakes appear to have declined somewhat during the past several decades. While this is not of concern within most of the Finger Lakes due to their substantial buffering capacity, conditions within Canadice Lake bear watching due to its relatively low buffering capacity as compared to the other Finger Lakes.

The primary focus of the Sediment Core Investigation is to assess chemical trends within the Finger Lakes. A sediment core taken from the bottom of a lake can provide a chronological history of lake conditions. A single sediment core was collected from the deep water portion of each of the 11 Finger Lakes. Of the 11 sediment cores collected, 9 of the cores provide adequate radiometric profiles to support establishment of sediment dates (using cesium-137 and/or lead-210) – which provides the context for chemical chronologies within the given lake. Exceptions were Cayuga Lake and Hemlock Lake cores which failed to provide acceptable radiometric profiles. Computed sediment accumulation rates within the Finger Lakes ranged from approximately 0.2 cm/year for Canadice Lake and Skaneateles Lake to 0.7 cm/year for Otisco Lake, and were fairly consistent with findings of primary productivity for the lakes – lakes with higher levels of primary productivity show greater sediment accumulation rates. Chemical findings from the sediment core investigation are used as a means for assessing spatial differences between the 11 lakes, temporal trends within individual lakes, and comparisons to sediment quality guidance values – threshold effect level (TEL) and probable effect level (PEL).

The primary *organic* chemicals detected within the Finger Lakes sediment cores are *dichlorodiphenyl-trichloroethane (DDT)* and its metabolites, and *Polychlorinated biphenyl's (PCBs)*. These anthropogenic compounds are currently banned for use in the United States. In general, findings for DDT and its metabolites indicate that peak concentrations occurred several decades ago and that concentrations have declined markedly since that time. Although levels have declined, surficial sediment DDT concentrations remain above the TEL for total DDT in Keuka, Seneca, Conesus, and Canandaigua Lakes. As expected from the existing fish consumption advisory, Keuka Lake sediments show the highest DDT levels. However, indications from both sediments and fish flesh analyses suggest that DDT levels continue to decline in Keuka Lake. Findings for PCBs are somewhat less certain due to detection limitations associated with the analytical methods employed. PCB Aroclors, which were the primary focus of the PCB investigation, were detected in only a single core segment from Canadice Lake. PCB congener analyses (a more sensitive and also more expensive analysis) were also run on a single core segment from each of the lakes. PCB congeners were detected in all of the lakes in which testing was conducted (10 of 11 lakes). Total PCB results (summation of all measured congeners) indicate that sediment PCB levels within several of the lakes exceed upper sediment quality guidance values. Unfortunately, no trend analysis is possible from the data due to the fact that only a single core segment was evaluated from each lake. Furthermore, the core segment chosen for analysis on each of the lakes was taken from several centimeters below the top of the core, and thus may not represent current conditions. One intriguing finding concerning PCBs is that the total PCB concentrations detected in Conesus Lake and Seneca Lake are somewhat higher than the level detected in Canadice Lake, despite the fact that Canadice Lake has a fish consumption advisory currently in place.

A number of *inorganic* chemicals were also detected in the sediment cores extracted from the Finger Lakes. It is important to note that most of these substances can originate from natural, as well as, human sources. The most noteworthy findings are as follows. *First*, arsenic levels within upper sediments of several of the Finger Lakes are significantly enriched. The surficial sediments in several of the lakes exceed both lower and upper sediment quality values (TEL and PEL). There are several plausible explanations for this enrichment ranging from loading issues to geo-chemical processes, however, no definitive conclusions are possible at this juncture. Preliminary water column sampling was initiated in 1999 in response to the sediment core arsenic findings in an effort to assess possible drinking water implications. Preliminary findings are encouraging in that most samples were below the analytical detection level (10 ug/l). However, given the limited nature of the sampling (analytical, spatial, and temporal), and the fact that the USEPA is currently evaluating the existing maximum contaminant level (MCL) for arsenic, would suggest that additional study is warranted. *Second*, nickel levels while relatively homogeneous throughout each core, are above the TEL and PEL in many of the lakes. *Third*, several contaminants (chromium, copper, lead, and zinc) were found to exceed TEL values. In the case of copper, Otisco Lake was found to exceed the upper guidance values – likely due to copper sulfate treatments for algal growth. *Fourth*, while lead levels continue to exceed lower sediment quality values, the levels have declined markedly in many of the Finger Lakes. The declines observed in many of the

lakes coincide very well with known restrictions on the use of leaded gasoline. *Fifth*, calcium levels within the sediments of many of the Finger Lakes show a marked increase over the past half century. Sediment calcium levels have increased by as much as 5-8 fold in some of the lakes. While the reason(s) for this increase are not certain, possibilities include the effects of acid rain, agriculture practices, among others. As discussed above, calcium increases might lead to an exacerbation of Zebra mussel related effects within the Finger Lakes.

Summary findings for each of the Finger Lakes are as follows. *Otisco Lake*, which is one of the smaller Finger Lakes, is a multi-purpose lake located in the Seneca-Oswego River Basin. The lake serves as a source of water supply for the City of Syracuse, and is best characterized as *eutrophic*. Trophic conditions within Otisco Lake have increased somewhat since the early 1970s, as evidenced by moderate increases in total phosphorus and chlorophyll *a* levels within the lake. The lake also undergoes sustained periods of hypolimnetic anoxia during the growing season. Major ion trends within Otisco Lake over the past several decades indicate *declines* in calcium, magnesium, and alkalinity levels, and *increases* in sodium, chloride, and sulfate levels. Sediment core findings from Otisco Lake indicate a *sediment accumulation rate* of 0.74 cm/year, which is one of the highest rates measured within the Finger Lakes. *Organic* chemical findings from the Otisco Lake sediment core indicate a total PCB concentration of 245 ppb at a sediment depth of 3-4 cm (~ 1990s) which is in the middle range of total PCB levels observed within the Finger Lakes, and is above the TEL for total PCBs. *Inorganic* chemical findings from the Otisco Lake sediment core indicate elevations in copper and nickel levels. Surficial sediments exceed the TEL for copper and the PEL for nickel. There is also a significant increase in sediment calcium levels over the past half century. Finally, sediment core findings indicate a substantial reduction in lead levels over the past several decades. *Recommendations* for Otisco Lake include: (1) Continue efforts to control nutrient inputs to the lake; (2) Evaluate the cause(s) and ecological effects of hypolimnetic anoxia within the lake; (3) Implement measures to minimize the input of salt to the watershed and the lake; (4) Continue to periodically monitor biota for chlorinated organic chemicals; (5) Evaluate the cause(s) and ecological effects of sediment nickel levels; and (6) Monitor Zebra mussel population dynamics within the lake and assess the ecological effects associated with this invasive exotic.

Skaneateles Lake, which is one of the six larger Finger Lakes, is a multi-purpose lake located in the Seneca-Oswego River Basin. The lake serves as a public water supply for the City of Syracuse, and is best characterized as *oligotrophic*. Trophic conditions within Skaneateles Lake have declined substantially over the past several decades, as evidenced by marked declines in total phosphorus and chlorophyll *a* levels, and a moderate increase in water clarity. The lake continues to be well oxygenated throughout the growing season. Major ion trends within Skaneateles Lake over the past several decades indicate *declines* in magnesium, and sulfate levels, and *increases* in sodium, and chloride levels. Sediment core findings for Skaneateles Lake indicate a *sediment accumulation rate* of approximately 0.2 cm/year, which is one of the lowest accumulation rates observed in the Finger Lakes. *Organic* chemical findings from the Skaneateles Lake sediment core indicate a total PCB concentration of 286 ppb (from 2-3 cm depth which represents the mid 1980s), which is in the middle range of total PCB levels observed within the Finger Lakes, and is above the TEL and slightly above the PEL. *Inorganic* chemical findings from Skaneateles Lake indicate a marked increase in arsenic and manganese levels within surficial sediments. Subsequent water column sampling, albeit limited, has not detected arsenic above 10 ug/l (detection level). There are also elevated levels of nickel within the sediments of Skaneateles Lake, with levels exceeding the TEL and PEL. Sediment core findings also indicate a moderate decline in lead levels over the past several decades. *Recommendations* for Skaneateles Lake include: (1) Efforts to control the input of nutrients to the lake have apparently been successful, and such efforts should continue; (2) Efforts to control inputs of salt to the watershed and the lake should be implemented and/or enhanced; (3) Continue periodic monitoring of biota for chlorinated organic chemicals; (4) Investigate the cause(s) of arsenic enrichment within surficial sediments and further assess possible environmental consequences of such increases; (5) Evaluate the cause(s) and ecological effects of elevated nickel levels; and (6) Monitor Zebra mussel population dynamics within the lake and assess the ecological effects associated with this invasive exotic.

Owasco Lake, which is one of the six larger Finger Lakes, is a multi-purpose lake located within the Seneca-Oswego River Basin. The lake serves as a drinking water supply for the City of Auburn, and is best characterized as mesotrophic. Trophic conditions within Owasco Lake have shown some limited change over the past several decades, with a moderate decline in chlorophyll *a* levels, but generally stable phosphorus concentrations and water clarity levels. As in the past, the lake remains well oxygenated throughout the growing season. Major ion trends within Owasco Lake over the past several decades indicate *declines* in calcium and sulfate levels, and *increases* in sodium and chloride levels. Sediment core findings for Owasco Lake indicate a *sediment accumulation rate* of 0.38 cm/year, which is in the middle range of accumulation rates observed in the Finger Lakes. *Organic* chemical findings from the Owasco Lake sediment core indicate a total PCB concentration of 374 ppb (from 3-4 cm depth representative of the late 1970s), which is in the upper range of total PCB levels observed within the Finger Lakes, and is above the TEL and PEL for PCBs. The PCB pattern was dominated by lower chlorinated congeners. *Inorganic* chemical findings from the Owasco Lake sediment core indicate a slight increase in arsenic levels within surficial sediment layers, and levels exceed the TEL but are slightly below the PEL. Subsequent water column sampling from Owasco Lake showed one measurement at 10 ug/l (which is below the current MCL). Nickel levels within lake sediments are consistently above the TEL and PEL. Sediment core findings also indicate a marked decline in lead levels with Owasco Lake over the last several decades. *Recommendations* for Owasco Lake include: (1) Continued efforts to control the release of nutrients within the Owasco Lake watershed are warranted; (2) Management efforts regarding the use and storage of salt within the watershed are suggested; (3) Continue periodic monitoring of aquatic biota for chlorinated organic chemicals; (4) Investigate the cause(s) of arsenic enrichment within surficial sediments and further assess the possible environmental consequences of such increases; (5) Evaluate the cause(s) and ecological effects of elevated nickel levels; and (6) Monitor Zebra mussel population dynamics within the lake and assess the ecological effects associated with this invasive exotic.

Cayuga Lake, which is one of the two largest Finger Lakes, is a multi-purpose lake located within the Seneca-Oswego River Basin. The lake serves as a public water supply for the City of Ithaca, and several other communities within the basin. The Synoptic Water Quality Investigation of Cayuga Lake is divided into an assessment of the main lake (deep basin) and the southern shelf of the lake. The reason for this bifurcation is that water quality conditions vary substantially between these two lake segments, and that a number of water quality concerns (water supply, swimming, etc.) have been raised specifically about the southern end of Cayuga Lake. The main portion of Cayuga Lake is best characterized as borderline between oligotrophic and mesotrophic. Trophic conditions within the main lake have declined over the past several decades, however, the level of decline has varied substantially between major trophic indicators. Findings from this study indicate a substantial decline in total phosphorus levels over the past several decades, with much smaller declines in chlorophyll *a*, and a moderate increase in water clarity since the early 1970s. These changes would indicate that nutrient control measures within the Cayuga lake watershed have been fairly effective with respect to the deep lake. As has been the case historically, Cayuga Lake appears to remain well oxygenated throughout the growing season. The trend for major ions within the main portion of Cayuga Lake over the past several decades indicate substantial *reductions* in sodium and chloride, and more modest *declines* in sulfate and alkalinity levels. Historically, there has been a marked longitudinal gradient in trophic conditions within Cayuga Lake moving from the southern shelf northward to the deep basin, with decreasing levels of total phosphorus and chlorophyll *a*, and increasing water clarity levels. The marked elevation in certain trophic indicators within the south lake continues at present, although there are indications of possible changes. Results from this investigation indicate that total phosphorus levels within the south shelf segment are substantially higher than in the main lake, and that the mean seasonal total phosphorus concentration exceeds the NYSDEC total phosphorus guidance value (20 ug/l) in certain years. Other recent studies confirm this finding (UFI, 2000, Sterns and Wheler, 1997). Findings for chlorophyll *a* and Secchi Disk depth are somewhat more equivocal with respect to longitudinal differences. While early findings from this investigation indicate marked longitudinal differences in chlorophyll *a* and water clarity levels, more recent findings suggest less apparent differences. It is believed that increases in Zebra mussel population numbers in the south lake may be causing a downward trend in chlorophyll *a* and an upward trend in water clarity within the

south shelf area. Findings from the Cayuga Lake sediment core are limited due to the lack of an intact radiometric profile within the core, and anomalously low chemical findings. *Recommendations* for Cayuga Lake include: (1) Efforts to control nutrient (particularly phosphorus) and sediment loads within the Cayuga Lake watershed should be continued. This is particularly important within the south-lake catchment where use impairments are present. Additional study of water quality dynamics within the south lake should be pursued – this should include development of accurate estimates of nutrient and sediment loads to the southern catchment, and a coupled watershed/lake mass balance model for the south lake. Furthermore, a thorough assessment of use impairment issues (water supply, primary contact recreation, and aesthetic concerns) should be initiated, and should include evaluation of remedial measures; (2) Collection of an additional deep water sediment core(s) is also recommended; (3) Continue periodic monitoring of aquatic biota for chlorinated organic chemicals; and (4) Establish a Zebra mussel monitoring program within the lake to understand population dynamics and assess ecological effects associated with this invasive exotic.

Seneca Lake, which is one of the two largest Finger Lakes, is a multi-purpose lake located within the Seneca-Oswego River Basin. The lake serves as a source of public water supply for the City of Geneva and the Villages of Ovid, Waterloo, and Watkins Glen. Trophic conditions within Seneca Lake have declined substantially over the past several decades, as evidenced by marked declines in total phosphorus and chlorophyll *a* levels, and a substantial increase in water clarity. Furthermore, the lake continues to be well oxygenated throughout the growing season. Major ion trends within Seneca Lake indicate significant *declines* in chloride and sodium levels, and a smaller decline in calcium levels, as well as *increases* in sulfate and alkalinity levels. Sediment core findings for Skaneateles Lake indicate a *sediment accumulation rate* of 0.23 cm/year, which is one of the lowest accumulation rates observed in the Finger Lakes. *Organic* chemical findings from the Seneca Lake sediment core indicate a substantial decline in total DDT levels over the past several decades, but levels remain above the TEL. Sediment core findings indicate a total PCB concentration of 466 ppb (from 4-6 cm sediment depth representative of the late 1970s), which is in the upper range of total PCB levels observed within the Finger Lakes, and is above the TEL and PEL for PCBs. *Inorganic* chemical findings from the Seneca Lake sediment core indicate that arsenic levels are near or slightly above the PEL, although arsenic levels do not show the marked surficial enrichment seen in several of the other Finger Lakes. Subsequent water column sampling within Seneca Lake, albeit limited, has shown no detectable arsenic concentrations above 10 ug/l (analytical detection limit). Cadmium levels within the sediments were stable, and were above the TEL but below the PEL. As with many of the Finger Lakes, calcium concentrations within the sediments of Seneca Lake have increased substantially over the past several decades. Lead levels within Seneca Lake sediments have declined precipitously over the past several decades, and are below the PEL – however, they remain above the TEL. Mercury levels within Seneca Lake sediments have declined by approximately 50 percent over the past 40 years, and surficial concentrations are below the TEL and the PEL for total mercury. Nickel levels within the sediments of Seneca Lake are basically stable over the past half century, and concentrations are above the TEL but below the PEL. *Recommendations* for Seneca Lake include: (1) Efforts to control nutrient inputs to the lake have apparently been successful, and such efforts should continue; (2) Investigation of sodium and chloride dynamics within Seneca Lake should continue, and control measures for salt discharge within the watershed and the lake should be continued; (3) Continue periodic monitoring of aquatic biota for chlorinated organic chemicals; (4) Investigate the cause(s) of arsenic enrichment within lake sediments and further assess possible environmental consequences of such increases; (5) Evaluate the cause(s) and ecological effects of elevated nickel levels; and (6) Monitor Zebra mussel population dynamics within the lake and assess ecological effects associated with this invasive exotic.

Keuka Lake, which is one of the six larger Finger Lakes, is a multi-purpose water body located in the Seneca-Oswego River Basin. The lake is a source of public water supply for the Villages of Hammondsport and Penn Yan. Trophic conditions within Keuka Lake have declined markedly over the past several decades, as evidenced by substantial declines in total phosphorus and chlorophyll *a* levels, and a moderate increase in water clarity. The lake continues to be well oxygenated throughout the growing season. Major ion trends within Keuka Lake over the past several decades indicate *declines* in magnesium and sulfate levels, and *increases* in calcium, sodium, chloride, and alkalinity levels. Sediment core findings from Keuka Lake indicate a *sediment accumulation rate* of 0.37 cm/year, which is in the middle range of rates observed within the Finger Lakes. *Organic* chemical findings for Keuka Lake indicate that total DDT levels within the sediments of Keuka Lake have declined markedly, from a peak of nearly 400 ppb in the late 1970s to current levels of 72 ppb - this is consistent with recent fish flesh findings. While trends are encouraging, DDT levels remain above the TEL, but below the PEL. Sediment core findings also indicate a total PCB concentration of 449 ppb (289 ppb when adjusted for DDE) from a single sediment core segment (mid 1980s). The later value (289 ppb) is more appropriate given historical DDT levels in the lake, and is in the middle range of levels measured in Finger Lakes sediments – this is above the TEL and PEL for total PCBs. *Inorganic* chemical findings from the Keuka Lake sediment core indicate a marked increase in arsenic and manganese levels within surficial sediments. Subsequent water sampling, albeit limited, did not detect arsenic above 10 ug/l (analytical detection level). There are elevated levels of nickel within the sediments of Keuka Lake, and levels exceed the TEL and PEL. Findings also indicate a substantial decline in lead levels within Keuka Lake sediments over the past several decades. *Recommendations* for Keuka Lake include: (1) Efforts to control the input of nutrients to Keuka Lake have apparently been successful, and should be continued; (2) Management efforts to control the use salt within the watershed should be implemented and/or enhanced; (3) Continue periodic monitoring of biota for chlorinated organic chemicals; (4) Further investigation is warranted regarding the cause(s) of arsenic enrichment within lake sediments and possible consequences of this phenomenon; (5) Evaluate the cause(s) and ecological effects of elevated nickel levels; and (6) Monitor Zebra mussel population dynamics within the lake and assess ecological effects associated with this invasive exotic.

Canandaigua Lake, which is one of the six larger Finger Lakes, is a multi-purpose water body located in the Seneca-Oswego River Basin. The lake serves as a source of public water supply for the City of Canandaigua, and several other communities within the watershed. Trophic conditions within Canandaigua Lake have declined substantially over the past several decades, as evidenced by marked declines in total phosphorus and chlorophyll *a* levels, and a substantial increase in water clarity. The lake continues to be well oxygenated throughout the growing season. Trends for major ions within Canandaigua Lake over the past several decades indicate *declines* in magnesium and sulfate levels, and *increases* in sodium, chloride, and alkalinity concentrations. Sediment core findings within Canandaigua Lake indicate a *sediment accumulation rate* of approximately 0.2 cm/year, which is one of the lowest sediment accumulation rates within the Finger Lakes. *Organic* chemical findings from Canandaigua Lake indicate that total DDT levels within the sediments of Canandaigua Lake have declined markedly over the last several decades. However, DDT levels remain above the TEL within surficial sediments. *Inorganic* chemical findings from the Canandaigua Lake sediment core indicate a marked increase in arsenic and manganese levels within surficial sediments. Subsequent water column sampling, albeit limited, has not detected arsenic above 10 ug/l (detection level). There are elevated levels of nickel within the sediments of Canandaigua Lake, with levels exceeding the TEL and PEL. Findings also indicate a substantial decline in lead levels within Canandaigua Lake sediments over the past several decades. *Recommendations* for Canandaigua Lake include: (1) Efforts to control the input of nutrients to Canandaigua Lake have apparently been successful over the past several decades, and such control measures should continue; (2) Management efforts regarding the storage and use of salt within the watershed are suggested; (3) Continue periodic monitoring of aquatic biota for chlorinated organic chemicals; (4) Further investigation is warranted regarding the cause(s) of arsenic enrichment within lake sediments and assessment of possible environmental consequences; (5) Evaluate the cause(s) and ecological effects of elevated nickel levels; and (6) Monitor Zebra mussel population dynamics within the lake and assess ecological effects associated with this invasive exotic.

Honeoye Lake, which is one of the five smaller Finger Lakes, is a multi-purpose water body located in the Genesee River Basin. While the lake is classified "AA", it is not presently used as a public water supply. Trophic conditions within Honeoye Lake are best characterized as eutrophic, which is similar to the overall trophic status of the lake over the past several decades. However, current levels of major trophic indicators are somewhat different than in the past. Findings suggest an increase in total phosphorus levels, a decline in chlorophyll *a* levels, and a small increase in water clarity within the lake. Total phosphorus levels within the lake are above the NYSDEC total phosphorus guidance value of 20 ug/l, and there are sustained periods of hypolimnetic hypoxia during the growing season. Trends for major ions within Honeoye Lake over the past several decades indicate an *increase* in calcium, chloride, sodium, and alkalinity levels, and a *decrease* in sulfate and magnesium levels. Sediment core findings from Honeoye Lake indicate a *sediment accumulation rate* of approximately 0.5 cm/year, which is at the high end of accumulation rates observed within the Finger Lakes. *Organic* chemical findings from the Honeoye Lake sediment core indicate a total PCB concentration of 69 ppb from a single sediment core segment (3-6 cm sediment depth, which equates to approximately 1990). This is at the low end of total PCB levels observed in the Finger Lakes, however, it is above the TEL, but below the PEL. *Inorganic* chemical findings from the Honeoye Lake sediment core indicate that arsenic levels in the sediments increase in the 1970s and remain elevated thereafter. Surficial sediment arsenic concentrations are above the TEL and slightly above the PEL. Subsequent water column sampling, albeit limited, has not detected arsenic above 10 ug/l (detection level). Additional inorganic chemical findings from the Honeoye Lake sediment core indicate nickel levels above the TEL and PEL, and fluctuations in lead levels – initial decline followed by a recent increase. *Recommendations* for Honeoye Lake include: (1) Efforts to control the input of nutrients to Honeoye Lake should be continued and enhanced. Furthermore, efforts to understand nutrient loading to the lake, and to assess dissolved oxygen depletion within the lake are recommended. This should include the derivation of accurate tributary nutrient loads to the lake and review of permitted nutrient loads within the Honeoye Lake watershed; (2) Management efforts regarding the storage and use of salt within the watershed are indicated; (3) Continue periodic monitoring of aquatic biota for chlorinated organic chemicals; (4) Further investigation regarding the cause(s) of arsenic elevations within lake sediments and assessment of possible environmental consequences of such increases are warranted; (5) Evaluate the cause(s) and ecological effects of elevated sediment nickel levels; and (6) Implement a program to monitor Zebra mussel population dynamics within the lake and assess ecological effects associated with this invasive exotic.

Canadice Lake, which is one of the five smaller Finger Lakes, is located within the Genesee River Basin. The lake serves as a source of drinking water for the City of Rochester, and has fairly stringent watershed protection measures and lake use restrictions. The trophic status of Canadice Lake is best characterized as borderline between oligotrophic and mesotrophic, and trophic conditions are similar to those recorded several decades ago. Study findings also indicate sustained periods of hypolimnetic hypoxia within Canadice Lake during the later part of the growing season. Trends for major ions within Canadice Lake indicate an *increase* in the concentration of calcium, chloride, and sodium, and a *decrease* in sulfate and magnesium levels. Sediment core findings indicate a *sediment accumulation rate* of approximately 0.2 cm/year, which is one of the lowest accumulation rates measured within the Finger Lakes. *Organic* chemical findings from the Canadice Lake sediment core indicate a decline in DDT metabolites within lake sediments in recent decades. Sediment core findings also indicate a total PCB concentration of 352 ppb (4-6 cm sediment depth, representing the early 1970s), which is in the middle range of total PCB levels observed in other Finger Lakes cores, and is above the TEL and PEL for total PCBs. *Inorganic* chemical findings from the Canadice Lake sediment core indicate a significant increase in arsenic levels over the past several decades. This phenomenon of arsenic enrichment within upper sediment layers is also apparent in a number of the other Finger Lakes. The arsenic levels observed in the surficial sediments of Canadice Lake are above the TEL and PEL. Subsequent water column sampling, albeit limited, has not detected arsenic above 10 ug/l (detection level). Sediment core findings also indicate substantial increases in calcium levels within Canadice Lake over the past several decades – a pattern repeated in a number of other Finger Lakes. Manganese levels have also increased within Canadice Lake sediments in recent years, and roughly parallel arsenic changes. Nickel levels are fairly

constant over the observed period, but are above the TEL and PEL. Sediment lead concentrations have declined substantially in recent decades, and are near the TEL for lead. *Recommendations* for Canadice Lake include: (1) Efforts to control the input of nutrients to Canadice Lake should be continued. Furthermore, efforts to understand nutrient loading to the lake, and to assess dissolved oxygen depletion dynamics within the lake are recommended; (2) Management efforts regarding the use and storage of salt within the watershed are suggested; (3) Continue periodic monitoring of aquatic biota for chlorinated organic chemicals; (4) Additional investigation is warranted regarding the cause(s) of arsenic/manganese elevations within lake sediments and possible environmental consequences of such increases; (5) Evaluate the cause(s) and ecological effects of elevated nickel levels; and (6) A program to monitor Zebra mussel population dynamics within the lake and assess ecological effects associated with this invasive exotic should be implemented – with particular attention on ambient calcium availability.

Hemlock Lake, which is one of the five smaller Finger Lakes, is located in the Genesee River Basin. Hemlock Lake is a source of public water supply for the City of Rochester, and has fairly stringent watershed protection measures and lake use restrictions. The trophic status of Canadice Lake is best characterized as borderline between oligotrophic and mesotrophic, as evidenced by current levels for major trophic indicators. Findings indicate a significant reduction in chlorophyll *a* levels and a significant increase in water clarity within Hemlock Lake over the past several decades. However, total phosphorus levels remain approximately equivalent to levels measured during the early 1970s. Furthermore, the hypolimnion of Hemlock Lake becomes hypoxic during the mid to late summer, with dissolved oxygen levels as low as 1 mg/l in certain deep water locations. Trends for major ions within Hemlock Lake indicate an *increase* in the concentration of calcium, chloride, and sodium, and a *decrease* in sulfate, and magnesium levels. Sediment core findings from Hemlock Lake are limited due to the lack of an intact radiometric profile. Thus, no sediment accumulation rate could be determined for the lake, and chemical findings must be viewed as composite values (no temporal, or trend information is discernable). *Organic* chemical findings from the Hemlock Lake sediment core indicate total DDT levels range from 25-49 ppb. Sediment core findings from Hemlock Lake also indicate a total PCB concentration of 67 ppb (4-6 cm sediment depth), which is at the low end of total PCB levels observed in other Finger Lakes cores, but is above the TEL for total PCBs. *Inorganic* chemical findings for Hemlock Lake indicate that sediment arsenic concentrations are above the TEL and PEL. Subsequent water column sampling, albeit limited, has not detected arsenic above 10 ug/l (detection level). Additional inorganic chemical findings for Hemlock Lake indicate nickel levels exceed the TEL and PEL. *Recommendations* for Hemlock Lake include: (1) Efforts to control the input of nutrients to Hemlock Lake should be continued. Furthermore, efforts to understand nutrient loading to the lake, and to assess dissolved oxygen depletion dynamics within the lake are recommended; (2) Management efforts regarding the use and storage of deicing agents within the watershed are indicated; (3) Continue periodic monitoring of aquatic biota for chlorinated organic chemicals; (4) Further investigation regarding the cause(s) of arsenic elevations within lake sediments and assessment of possible environmental consequences associated with such increases are warranted; (5) Evaluate the cause(s) and ecological effects of elevated nickel levels; (6) A program to monitor Zebra mussel population dynamics within the lake and assess ecological effects associated with this invasive exotic should be implemented; and (7) It would be beneficial to collect an additional deep water sediment core on Hemlock Lake for the purpose of assessing a sediment accumulation rate and chemical chronology within the lake.

Conesus Lake, which is one of the five smaller Finger Lakes, is a multi-purpose water body located in the Genesee River Basin. The lake serves as a source of public water supply for the Town of Livonia, and the Villages of Avon and Geneseo. The trophic status of Conesus Lake is best characterized as eutrophic, as evidenced by the levels of major trophic indicators. Findings indicate that trophic conditions within Conesus Lake have increased somewhat since the early 1970s. The mean annual total phosphorus level of the lake has increased slightly and is above the New York State total phosphorus guidance value of 20 ug/l, and water clarity has declined moderately. Furthermore, the hypolimnion of Conesus Lake becomes anoxic during mid to late summer, with dissolved oxygen levels dropping to near zero in a significant portion of the hypolimnion. Trends for major ions within Conesus Lake indicate an *increase* in the concentration of sodium, and a *decline* in calcium, magnesium, sulfate, and alkalinity levels. Sediment core findings from Conesus Lake indicate a *sediment accumulation rate* of approximately 0.4 cm/year, which is in the mid to upper range of accumulation rates observed in the Finger Lakes. *Organic* chemical findings from the Conesus Lake sediment core indicate that total DDT levels declined from the early 1960s to the early 1970s, and plateau thereafter. The total DDT levels observed are above the TEL but below the PEL. PCB findings from the Conesus Lake sediment core indicate a total PCB level of 490 ppb (at 4-6 cm sediment depth, which represents sediments deposited during the mid 1980s). This is the highest level of total PCBs observed within the Finger Lakes cores, and is above the TEL and PEL for total PCBs. *Inorganic* chemical findings for Conesus Lake indicate fairly high arsenic concentrations within benthic sediments. However, in contrast to some of the other lakes, there was not a marked increase in arsenic levels within surficial sediment layers. The arsenic levels observed were above the TEL and near or above the PEL for arsenic. Subsequent water column sampling, albeit limited, has not detected arsenic above 10 ug/l (detection level). Additional inorganic chemical findings from the Conesus Lake sediment core indicate fairly constant nickel concentrations that are above the TEL and PEL. Sediment core findings also indicate a substantial decline in lead levels within the sediments of Conesus Lake over the past several decades. *Recommendations* for Conesus Lake include: (1) Efforts to control the input of nutrients to Conesus Lake should be continued and enhanced. Furthermore, efforts to understand nutrient loading to the lake, and to assess dissolved oxygen depletion within the lake are recommended. This should include the derivation of accurate nutrient load estimates to the lake, and an assessment of existing nutrient load allocations within the watershed; (2) Management efforts regarding the storage and use of salt within the watershed are recommended; (3) Continue periodic monitoring of aquatic biota for chlorinated organic chemicals; (4) Further investigation regarding the cause(s) of arsenic elevations within lake sediments and assessment of possible environmental consequences of such levels are warranted; (5) Evaluate the cause(s) and ecological effects of elevated nickel levels; and (6) A program to monitor Zebra mussel population dynamics within the lake and assess ecological effects associated with this invasive exotic should be implemented.

Chapter 2: Introduction

The Finger Lakes are a series of 11 glacially formed lakes located in central New York State (see Figure 2.1). Native American legend suggests that *the lakes were formed when the creator paused in his work and placed his hands upon the Earth to rest*. On more pragmatic and scientific grounds, the Finger Lakes have garnered similar appreciation as illustrated by the words of E.A. Birge and C. Juday some 90 years ago "It is probable that there is no group of lakes in the world which offer the limnologist such opportunities for working out the problems of his science" (Birge and Juday, 1914). Individual lake names, also of Native American origin, are coarsely interpreted in Table 2.1.

Table 2.1: Finger Lake names and meanings

Lake	Native American Meaning
Conesus	"place where there are lots of berries"
Hemlock	not available
Canadice	"long lake"
Honeoye	"lying Finger"
Canandaigua	"the chosen place"
Keuka	"canoe landing"
Seneca	"place of the stone" or "stony place"
Cayuga	"boat landing"
Owasco	"the crossing" or "floating bridge"
Skaneateles	"long lake"
Otisco	"waters dried up or gone away"

The Finger Lakes and associated watersheds encompass a combined drainage area of nearly 12,000 square kilometers (approximately 4,600 square miles), and include all or portions of 12 New York State counties (see Table 2.2). While the million or so people of these 12 counties do not all reside within the Finger Lakes watershed, they are within commuting distance of the lake(s). Thus, the Finger Lakes represent a significant natural asset to the central New York region. It is important to understand, however, that the Finger Lakes Region is valued by even greater numbers of New Yorkers, as well as non-New Yorkers, as reflected in tourism activity within the region.

Figure 2.1: Finger Lakes Map

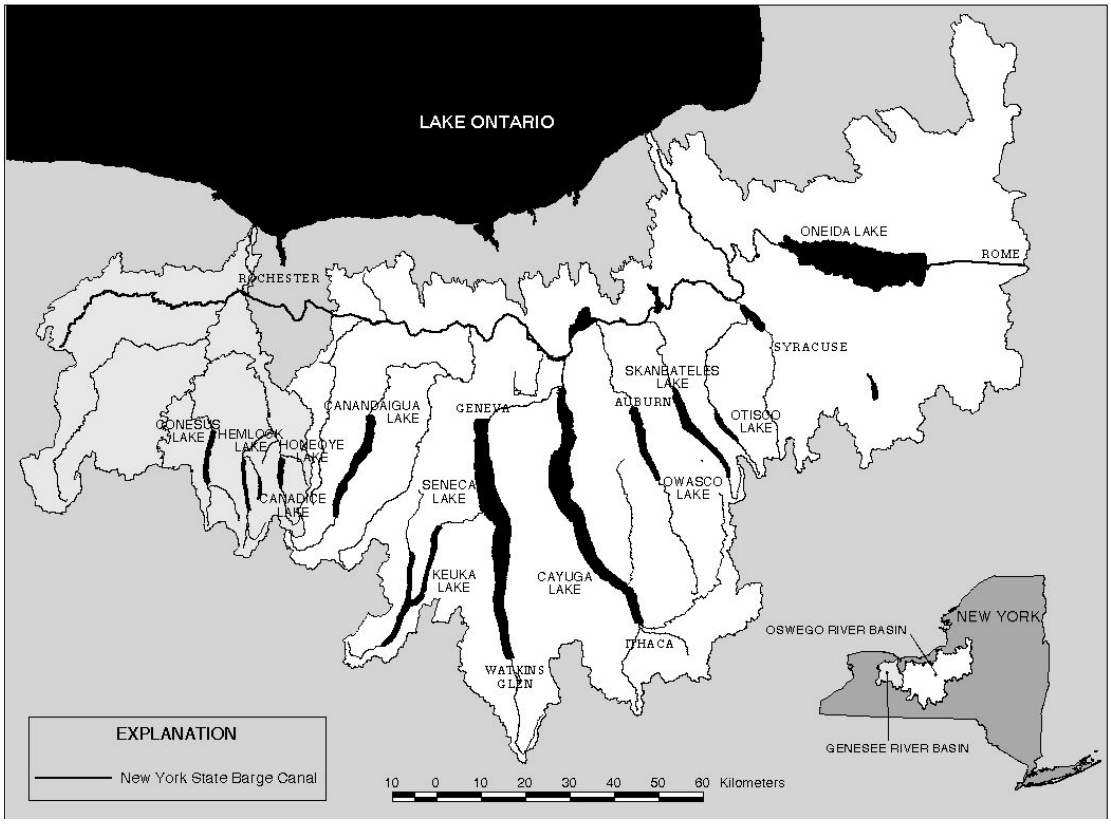


Table 2.2: Finger Lakes counties

County	*Population* [1]	*Lake and/or Watershed*
Cayuga	81, 703	**Cayuga, Owasco**, Skaneateles
Chemung	91,738	Seneca
Cortland	48,006	Cayuga, Otisco, Skaneateles
Livingston	65,851	Canadice, Canandaigua, **Conesus**, **Hemlock**, Honeoye
Onondaga	456,215	**Otisco**, Owasco, **Skaneateles**
Ontario	99,791	**Canadice**, **Canandaigua**, Hemlock, **Honeoye,** Seneca
Schuyler	19,229	**Seneca**
Seneca	31,925	**Cayuga**, **Seneca**
Steuben	97,699	Canandaigua, **Keuka**
Tioga	52,216	Cayuga
Tompkins	97,656	**Cayuga**, Owasco
Yates	24,556	**Canandaigua, Keuka, Seneca**

Bold: means that all or part of the lake proper is within the county.
[1]: from US Census, 1999 estimate

Attracted in large measure by the natural beauty of the area, tourism in the Finger Lakes Region generates roughly 1.5 billion dollars annually with approximately 22.2 million visitations per year (Finger Lakes Association, 2000). The region offers a remarkable mix of majestic lakes and spectacular gorges. In fact, the Finger Lakes include 3 of the 10 largest lakes in New York State, and 6 of the 20 largest lakes in the Empire State. Figure 2.2 provides an example of the many scenic gorges within the region – this is the author's personnel favorite.

Most of the Finger Lakes are multipurpose water bodies, albeit, to varying degrees. Human uses of these lakes range from public water supply to wastewater assimilation. With the exception of Honeoye Lake, all of the Finger Lakes are used for public water supply. Table 2.3 provides a summary of existing water supply usage for each of the lakes. Total permitted withdrawal from all of the Finger Lakes is approximately 180 million gallons per day (MGD).

Figure 2.2: Upper gorge at Robert H. Treman State Park

Table 2.3: Public water supply withdrawals

Lake	**# of Permitted Withdrawals**	**Total Permitted Withdrawals (MGD)**
Conesus	3	6.9
*Hemlock	1	37
*Canadice	see Hemlock	combined w/ Hemlock
Honeoye	0	0
Canandaigua	5	~ 16
Keuka	3	5.36
Seneca	4	~ 9
Cayuga	4	11.2
Owasco	2	16.0
Skaneateles	1	58.0
Otisco	1	20.0

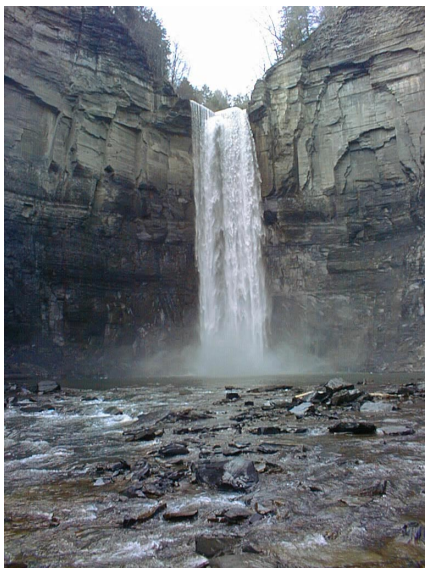
* The permit for Hemlock and Canadice is based on total from both lakes

Origin and Morphology

While the physical structure of the lake basins continue to evolve today, through processes such as sediment deposition and scour, the basic structure of the lake basins was largely complete some 10,000 years ago following "final" retreat of the Laurentide ice sheet.

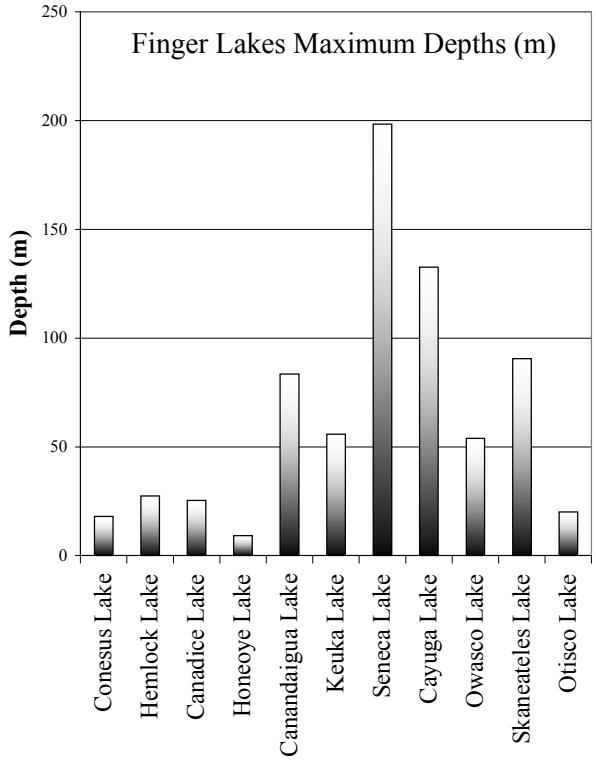
Current theory suggests that the glaciers functioned as extensive earth moving operations by gouging out the lake basins and depositing vast quantities of glacial debris at the southern terminus of the present day Finger Lakes. These glacial forces, coupled with subsequent water runoff, are responsible for creating many of the spectacular natural features in the area (see Figure 2.3). These glacial forces were guided by pre-existing stream corridors and variations in underlying geology, preferentially removing the more erodible strata. The two largest lakes, namely, Seneca Lake and Cayuga Lake, were scoured to such an extent that the bottoms of these lakes are actually below sea level. For example, the water surface of Seneca Lake is at approximately 135 meters above sea level, while the maximum lake depth is approximately 200 meters. Thus, the lake bottom is approximately 65 meters below sea level. In fact, this is only the "tip of the proverbial iceberg" in that the sediments present at the bottom of Seneca Lake, much of which are the result of past glacial activity, account for more than 200 meters of additional scour. Thus, Seneca Lake, inclusive of both water column and sediments, is some 300 meters (nearly 1/5 of a mile) below sea level (Mullins, 1996).

Figure 2.3: Taughannock Falls



While of similar origins, the lakes vary significantly in size. For example, the volume of Seneca Lake is more than 400 times that of Honeoye Lake. Similarly, the lakes vary markedly in maximum depths (see Figure 2.4). Seneca Lake is the largest in terms of both volume and surface area, while, Cayuga Lake is the longest of the 11 lakes. On the other extreme, Honeoye Lake is the smallest of the Finger Lakes with respect to volume, and Canadice Lake is smallest in terms of surface area.

Figure 2.4: Comparison of maximum Finger Lakes depths (Bloomfield, 1978)



As one might surmise from the size disparity between the Finger Lakes, some have partitioned the lakes into the six larger lakes (Canandaigua, Keuka, Seneca, Cayuga, Owasco, and Skaneateles), and the five smaller lakes (Conesus, Hemlock, Canadice, Honeoye, and Otisco). Volumes of the larger lakes are measured in *billions* of cubic meters, while volumes of the smaller lakes are measured in *millions* of cubic meters. As will be discussed below, this disparity in lake size likely plays a significant role in water quality conditions within the Finger Lakes. Comparative information regarding the physical characteristics of each of the Finger Lakes is shown in Table 2.4.

Table 2.4: Physical characteristics of the Finger Lakes (Bloomfield, 1978)

Lake	*Mean;(Max) Depth (m)*	*Length (km)*	*Volume (10^6 m^3)*	*Surface Area (km^2)*	*Watershed (km^2)*	*Elevation (m above MSL)*
Conesus	11.5 (18)	12.6	156.83	13.67	180.5	249
Hemlock	13.6 (27.5)	10.8	105.89	7.2	96.2	275.8
Canadice	16.4 (25.4)	5.1	42.6	2.6	31.8	334
Honeoye	4.9 (9.2)	6.6	34.81	7.05	95	245
Canandaigua	38.8 (83.5)	24.9	1640.1	42.3	476.6	209.7
Keuka	30.5 (55.8)	31.6	1433.7	47	404.6	217.9
* Seneca	88.6 (198.4)	56.6	15539.5	175.4	1180.6	135.6
** Cayuga	54.5 (132.6)	61.4	9379.4	172.1	1145.2	116.4
Owasco	29.3 (54)	17.9	780.7	26.7	470	216.7
Skaneateles	43.5 (90.5)	24.2	1562.8	35.9	154	263
Otisco	10.2 (20.1)	8.7	77.8	7.6	93.8	240.2

* Seneca: watershed includes inflow from Keuka Lake.
** Cayuga: watershed excludes inflow from Seneca Lake at the northern end of the Cayuga Lake.

The Finger Lakes constitute a fairly compact system of lakes. The distance separating western-most Conesus Lake from eastern-most Otisco Lake is only about 125 km (~ 80 miles). The span in longitude ranges from approximately 77° 43' 41"W for the western edge of Conesus Lake to 76° 14' 53"W for the eastern edge of Otisco Lake. Latitude ranges from approximately 42° 23' 02"N for the south end of Seneca Lake to 42° 56' 43"N for the north end of Skaneateles Lake.

All of the Finger Lakes share a predominantly north-south orientation due to their glacial origins. In addition, nearly all of the lakes are characterized by a single elongated basin. The lone exception is Keuka Lake, which exhibits a "forked" or "Y" shaped basin structure – see Figure 2.1. The lakes also show an intriguing symmetry or "lake pairing". The most remarkable of these pairings is that of Canandaigua and Skaneateles Lakes. These two lakes are, in a number of respects, mirror images of one another. Their depths (both mean and maximums) are within 10 percent of each other, their volumes are within 5 percent of each other, and their lengths are within 3 percent of each other. As will be discussed later, this similarity extends to a number of water quality indicators. The lakes do differ substantially, however, with respect to drainage area. Similar parallels can be made between Seneca Lake and Cayuga Lake, albeit to a lesser extent.

Hydrology

The Finger Lakes are also divisible based on their respective drainage basins. As discussed above, glacial activities had a profound effect on the region (e.g., formation of the lake basins). Another significant physical change attributable to glacial forces was a change in the prevailing flow patterns within the region. Prior to glacial activities, flow patterns of the major tributaries within the region were from north to south. The enormous rock and sediment deposits (termed valley head moraines) created by the advance of the glaciers now act as great earthen dams and resulted in a reversal of flow within the primary tributaries in the region. Consequently, all 11 Finger Lakes now flow south to north. The Finger Lakes are all located within the Lake Ontario drainage basin. However, the lakes fall within two distinct sub-basins. The four western-most lakes (Conesus, Hemlock, Canadice, and Honeoye) are within the Genesee River Basin, while the remaining seven lakes (Canandaigua, Keuka, Seneca, Cayuga, Owasco, Skaneateles, and Otisco) are within the Seneca-Oswego Basin.

Surface runoff estimates for the Finger Lakes, as derived by various researchers, are summarized in Table 2.5. These estimates were developed based upon existing inflow data coupled with extrapolation to ungaged drainage areas. The estimates range from 10.1 x 10^7 m^3/year for Canadice Lake to 6.5 x 10^8 m^3/year for Seneca Lake. Tributary inflow, coupled with lake volume and several other factors (e.g., evaporation rate) determine the water retention time (WRT) of a lake.

Table 2.5: Estimated annual surface runoff

Lake	Estimated Surface Runoff (10^6 m^3 yr^{-1})	Estimated Surface Runoff (10^6 gal yr^{-1})
Conesus [2]	42	11,000
Hemlock [1]	36.6	9,700
Canadice [1]	10.1	2,700
Honeoye [1]	27.8	7,300
Canandaigua [3]	114	30,000
Keuka [1]	148	39,000
Seneca [1]	652	172,000
Cayuga [4]	543	143,000
Owasco [1]	255	67,000
Skaneateles [1]	81.6	21,500
Otisco [1]	33.5	8,800

[1]: Knox & Nordenson (1955), [2]: Stewart & Markello (1974)
[3]: Eaton & Kardos (1978), [4]: Oglesby (1978)

WRT refers to the average length of time a molecule of water will remain in a given lake. This is not to suggest that every molecule of water entering a lake will remain in the lake for the specified time period. Some will have a shorter retention time due to factors such as evaporation or proximity to an outfall, and some will have a longer tenure due to avoidance of such factors. WRT can be derived in several ways. The most common approach, termed a water balance, is an accounting of the various inflows and outflows to the system - the general equation governing a water balance is as follows:

Table 2.6: Estimated Retention Times (units of years)

Lake	*Shaffner & Oglesby (1978)*	*Michel & Kraemer (1995)*	
		Tritium	*Runoff*
Conesus	1.4	2.5	2.0
Hemlock	2.0	2.5	2.5
Canadice	4.5	2.0	4.0
Honeoye	0.8	1.5	1.0
Canandaigua	7.4	8.5	10.0
Keuka	6.3	6.0	8.0
Seneca	18.1	12.0	23.0
Cayuga	9.5	8.5	10.0
Owasco	3.1	1.5	3.0
Skaneateles	17.7	8.5	14.0
Otisco	1.9	1.0	1.5

$$\mathbf{WRT = (V) / (I - O - E)},$$

where, V = lake volume, I = average inflow to the lake, O = average outflow from the lake, and E = average evaporation from the lake. Isotope data can also be used to estimate WRT. Tritium, a radio-isotope of hydrogen, has a known rate of radioactive decay with a half-life of 12.43 years. Tritium levels within the environment peaked in the early 1960s and have been decreasing since that time. By tracking tritium changes over time one can estimate the residence or retention time of a lake. Estimates of retention times based on both methods are shown in Table 2.6. The WRT of a lake can determine the length of time that an introduced substance will remain in a lake, and also the ultimate fate of such a substance. In theory, lakes with shorter WRTs are quicker to respond to environmental change and tend to retain less of the materials entering the basin, whereas, lakes with longer retention times are slower to respond to environmental change and retain a larger proportion of materials entering the basin.

Lake water quality is strongly influenced by the quality and quantity of tributary inflow. For example, the trophic state (algal productivity) of a lake is often determined by the nutrient load from its tributary system.

Water Quality Issues

New York State has established water classification designations for most water bodies within the state based upon the best usage of the water body or water body "segment". A detailed description of the classification system can be found in Water Quality Regulations – Part 700-705 (NYSDEC, 1991). Water classification(s) for each of the Finger Lakes are summarized in Table 2.7.

Table 2.7: Water classifications of the Finger Lakes

Lake	Description	Classification
Conesus	entire lake	AA
Hemlock	entire lake	AA(T)
Canadice	entire lake	AA(TS)
Honeoye	entire lake	AA
Canandaigua	entire lake	AA(TS)
Keuka	entire lake	AA(TS)
Seneca	from north end south 2.4 miles	B
	portion within 1-mile radius of mouth of Keuka Lake Outlet	B
	Pastime Park south for 32 miles, excluding previous segment	AA (TS)
	Quarter Mile Creek to south end	B
Cayuga	Mud Lock south 2.1 miles to Bridgeport-Seneca Falls Road	B
	Cooley Corners Road south to 0.8 mi. north of Hamlet of Levanna	A(T)
	from 0.8 miles north of Levanna to McKinney's Point	AA (T)
	from McKinney's Point south to end of lake	A
Owasco	entire lake	AA(T)
Skaneateles	entire lake	AA
Otisco	entire lake	AA

Water quality conditions in the Finger Lakes are generally good. However, there are issues of concern as evidenced by the fact that each of the 11 Finger Lakes are included of the NYSDEC Priority Water List (PWL) [NYSDEC, 1996]. Water quality issues of concern vary by lake, ranging from fish consumption advisories due to persistent toxic substances (e.g., PCBs and DDT) to impairment of recreational activities (swimming, boating, etc.) due to algal blooms and nuisance aquatic plants. For example, three of the Finger Lakes (Canadice, Canandaigua, and Keuka) are currently subject to fish consumption advisories, and while recent data suggest improvements in fish contaminant levels, the advisories are still deemed necessary. There are also concerns relating to trophic conditions within a number of the Finger Lakes. Summaries of use impairments and contaminant categories are provided in Figures 2.5 and 2.6 respectively, while a tabular summary is presented in Table 2.8.

Figure 2.5: Finger Lakes use impairment summary

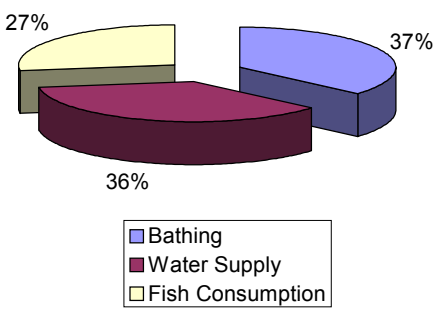


Figure 2.6: Finger Lakes contaminant summary

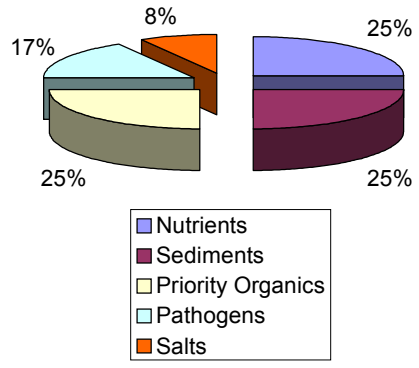


Table 2.8: Summary of 1996 Priority Waterbody List (NYSDEC, 1996).

Lake Name	County	Segment Description	Primary Impairment	Primary Pollutant
Canadice	Ontario	Entire Lake	Fish Consumption	PCBs
Canandaigua	Ontario	Entire Lake	Fish Consumption	PCBs
Cayuga	Cayuga	Northern end	Boating (macrophytes)	Nutrients
Cayuga	Seneca	Northern end	Bathing (macrophytes)	Nutrients
Cayuga	Tompkins	Southern end	Water Supply	Silt and Nutrients
Conesus	Livingston	Entire Lake in Conesus (T)	Bathing (macrophytes)	Nutrients
Hemlock	Ontario	Entire Lake in County	Water Supply	Hydro-modification
Honeoye	Ontario	Entire Lake	Water Supply	Nutrients
Keuka	Yates	Entire Lake	Fish Consumption	DDT
Otisco	Onondaga	Entire Lake	Bathing	Silt
Owasco	Cayuga	Entire Lake	Bathing	Pathogens
Seneca	Schuyler	Entire Lake w/in County	Water Supply	Salts
Seneca	Seneca	Entire Lake w/in County	Water Supply	Salts
Seneca	Yates	West side within County	Water Supply	Salts
Skaneateles	Onondaga	Northern 2/3 of Lake	Water Supply	Pathogens

The Finger Lakes and their surrounding watersheds vary markedly with respect to usage and watershed protection measures - ranging from largely single-use lakes with fairly stringent watershed protection measures to multi-use lakes with less restrictive watershed rules and regulations. Hemlock and Canadice Lakes, which serve as water supply reservoirs for the City of Rochester, have the most stringent watershed restrictions - a permit is required for public access to these lakes. Skaneateles Lake, a major source of drinking water for the City of Syracuse, is also governed by fairly stringent watershed protection measures, and is explicitly protected by New York State Environmental Conservation Law (ECL) - point source discharges to the lake and/or any of its tributaries are prohibited. The other Finger Lakes are subject to less stringent watershed regulations.

Past Water Quality Investigations

The first systematic limnological investigation of the Finger Lakes occurred nearly a century ago by two Wisconsin researchers (Birge and Juday 1914, 1921). While limited by the tools of their time, Birge and Juday established a valuable record of water quality conditions for this important series of lakes. They established the first record of water clarity levels and also recorded vertical profiles (temperature and dissolved gases) within the Finger Lakes. Following this initial foray, it would be nearly half a century before the next collective limnological investigation of the Finger Lakes took place.

In the early 1970s a group of researchers from the Finger Lakes Region initiated a comprehensive study of the Finger Lakes. Their efforts culminated in the publication "Lakes of New York State – Volume I: Ecology of the Finger Lakes" (Bloomfield, 1978). This study established baseline measurements of conventional trophic indicators as well as other physical, chemical, and biological characteristics of the Finger Lakes.

There are also a number of locally-driven monitoring activities occurring on several of the Finger Lakes. For example, both Canandaigua Lake and Keuka Lake have ongoing long-term monitoring programs involving both the lakes and selected tributaries. Local monitoring efforts are also occurring on several of the other Finger Lakes. However, comparative studies of water quality conditions within the entire system of lakes has not occurred since the early 1970s.

Current Investigation

The current investigation is designed to update the status and trends of water quality within the Finger Lakes. There are several approaches available for assessing the water quality of a lake. The most common approach involves periodic water column sampling within a given lake. Conventional water column monitoring is a valuable tool for assessing existing water quality conditions within a lake. The approach is generally used to assess the trophic status of a lake and/or to assess temporal trends in conventional limnological parameters related to lake water quality. However, unless sampling is conducted over an extended period of time - a diminishing likelihood given current resource constraints - and unless the monitoring effort includes chemicals of concern within the lake, the approach is seriously limited in its ability to characterize historical conditions and/or contaminant trends over time. Paleolimnology, or the study of past aquatic environments, offers an attractive addition to conventional water column monitoring, and can provide important insight into historical water quality conditions within a lake. Paleolimnological investigations generally involve the collection of a deep-water sediment core, followed by discrete segmentation of the core. Core segments can be analyzed individually for radiometric parameters, as well as for inorganic and organic chemical substances. The radiometric analyses are used to establish a timeline for the core, enabling one to assess historical chemical patterns within the lake. Sediment cores also offer the advantage of providing relatively high levels of chemical substances (relative to water column samples), which increases the likelihood of detecting particular chemical compounds. Thus, the collection of sediment cores can provide an important supplemental line of inquiry regarding historical lake trends.

The current investigation is designed to revisit the chemical limnology of the Finger Lakes, and to evaluate chemical trends in this system of lakes. Consistent with the previous discussion of available approaches, this Study is composed of two distinct, yet related, components:

(1) *Part A: Synoptic Water Quality Investigation* – ongoing investigation consisting of periodic water column sampling from one deep-water location within each of the 11 lakes, with a primary focus on conventional limnology and temporal trends over time; and

(2) *Part B: Sediment Core Investigation* – one-time effort consisting of the collection of a single sediment core from a deep-water location within each of the lakes, and focused upon sediment deposition rates, as well as organic and inorganic chemical trends over time.

While the efforts will be reported separately below, there are significant linkages between the two efforts. It is important to note that with the exception of chlorophyll *a*, this report will not evaluate the biological status of the Finger Lakes. As will be discussed in the recommendations, it is important that the biological status of the lakes be evaluated in the future. Unfortunately, the resources necessary to conduct such investigations were beyond those available to this study.

The remainder of the report is segmented into the two main components discussed above, and includes a discussion of study purpose, methods, findings and recommendations. Findings are presented based upon spatial comparisons between lakes, temporal trends within individual lakes, and comparison of study results to applicable regulatory criteria and/or possible issues of concern. The report concludes with summary remarks regarding each of the 11 Finger Lakes.

Part A: Synoptic Water Quality Investigation

Chapter 3: Purpose and Objectives

The purpose of Synoptic Water Quality Investigation is to systematically assess conventional limnological and water quality conditions in the 11 Finger Lakes. Specific objectives of this investigation include the following:

1. Assess current trophic status of the Finger Lakes and compare conditions between lakes;
2. Evaluate historical trends in trophic indicators for each of the Finger Lakes;
3. Assess current levels of major ions within the lakes and evaluate temporal trends;
4. Evaluate existing water quality conditions within the context of applicable regulatory criteria.

A second investigation, involving collection of sediment cores from each of the Finger Lakes to assess historical chemical patterns over time is presented in Part B.

Chapter 4: Design and Methods

This Investigation is composed of two components: (1) current synoptic investigation of the 11 lakes for conventional limnological parameters; and (2) review of findings from previous water quality studies within the Finger Lakes. The Synoptic Water Quality Investigation is designed to be conducted over a period of at least 5 years. It is felt that this is the minimum period of time necessary to accurately characterize this series of lakes, and to begin to assess water quality trends within this system of lakes.

The Synoptic Water Quality Investigation is composed of periodic sampling at a single deep water location on each of the 11 Finger Lakes during the growing season. The only exception to the single sample location per water body is for Cayuga Lake. Two additional sites have been established on the southern-shelf of Cayuga Lake to assess water quality concerns within this portion of the lake. Station locations and approximate water depths are provided in Table 4.1. Monitoring is conducted monthly during the growing season - in theory, May through October, however, in practice monitoring is frequently delayed until June. On these occasions, pre-stratification conditions may be missed for that particular year.

Table 4.1: Station locations and approximate water depths for Synoptic Water Quality Study

Lake	*Latitude*	*Longitude*	*Depth (m)*
Conesus	N 42° 45.645'	W 77° 42.839'	20
Hemlock	N 42° 44.102'	W 77° 36.873'	25
Canadice	N 42° 44.038'	W 77° 34.221'	25
Honeoye	N 42° 45.312'	W 77° 30.348'	8
Canandaigua	N 42° 45.973'	W 77° 19.058'	65
Keuka	N 42° 29.323	W 77° 09.297'	55
Seneca	N 42° 35.081'	W 76° 54.602'	70
Cayuga (deep)	N 42° 33.310'	W 76° 35.850'	50
Cayuga (shelf-W)	N 42° 28.070'	W 76° 31.120'	3
Cayuga (shelf-E)	N 42° 28.080'	W 76° 30.450'	5
Owasco	N 42° 50.670'	W 76° 30.960'	50
Skaneateles	N 42° 53.590'	W 76° 24.240'	60
Otisco	N 42° 52.040'	W 76° 17.570'	19

Field measurements include: (1) Secchi Disk depth; and (2) vertical water column profiles. Secchi Disk depth, a common measurement of water clarity, is measured using a 20 cm (~ 8 inch) diameter black and white disk. The Secchi disk is attached to a calibrated line and is slowly lowered into the water to the depth at which it disappears. The disk is then lifted until it reappears. An average of the two depths is then

recorded. Vertical water column profiles are taken with a Hydrolab® Surveyor IV probe, and parameters include temperature, dissolved oxygen, pH, and conductivity.

Water samples are collected from both the epilimnion and hypolimnion at each site. Sample depths are determined as follows: (1) epilimnetic samples are collected at the measured Secchi Disk depth; and (2) hypolimnion samples are collected at $2/3^{rd}$ station depth. Exceptions to this procedure are during non-stratified conditions and/or at monitoring locations with depths less than 10 meters. In these instances, a single water column sample is collected from the Secchi Disk depth.

Sample parameters have varied during the investigation due to funding constraints, etc. However, basic analytes include total phosphorus, ammonia nitrogen, nitrate+nitrite nitrogen, total Kjeldahl nitrogen, total organic carbon, major ions and trace metals, reactive silica, chlorophyll *a* and alkalinity. Table 4.2 provides a summary of analytical methods, and Table 4.3 describes processing and preservation methods.

Table 4.2: Analytical procedures for sample parameters and field measurements

PARAMETERS	METHOD
Phosphorus (all forms)	APHA 4500-PF
Ammonia nitrogen	USEPA 350.1
Nitrate (+ nitrite) nitrogen	USEPA 353.2
Total nitrogen	USEPA 351.2
Total organic carbon	USEPA 415.2
Dissolved organic carbon	USEPA 415.2
Dissolved inorganic carbon	APHA 4500-CO_2
Chloride	APHA 4500-Cl^- E
Reactive silica	USEPA 370.1
Metals (Fe, Ca, Mg, Na, K)	USEPA 200.7
Alkalinity	USEPA 310.1
pH	Hydrolab (1991)
Dissolved oxygen, in situ	Hydrolab (1991)
Temperature, in situ	Hydrolab (1991)
Specific conductance, in situ	Hydrolab (1991)

Table 4.3: Summary of processing, preservation, and sample containers

Parameter	Processing	Preservation	Hold Time (days)
Ortho-phosphorus	a	A	2
Total phosphorus	b	B	28
Ammonia nitrogen	b	A	28
Nitrate (+ nitrite) nitrogen	b	B	28
Total Kjeldahl nitrogen	b	A	28
Total organic carbon	b	B	28
Dissolved inorganic carbon	b	A	28
Dissolved organic carbon	b	A	28
Metals (Fe, Ca, Mg, Na, K, Pb)	b	C	182
Reactive silica	b	A	28
Total chlorides	b	A	28
SO_4	b	A	28
Chlorophyll a	a	D	30
Alkalinity	b	A	14

Processing: a - filtration through 0.45 µ cellulose nitrate filter
b - whole sample

Preservation: A - no addition, sample held at 4° C
B - 0.2 ml 5N H_2SO_4/20 ml of sample
C - 0.1 ml 1+1 HNO_3/20 ml of sample
D - $MgCO_3$, wrapped in aluminum foil, and frozen

In addition to the above measurements and analyses, intensive optics measurements were conducted at each of the primary sampling sites during the first two field seasons. The results of these investigations are available within a separate report (Effler, et al., 2000).

Chapter 5: Results and Findings

Results and findings from the Synoptic Water Quality Investigation will be presented in the following four sections: (a) thermal stratification and vertical profiles; (b) lake trophic indicators - Secchi Disk depths, total phosphorus, chlorophyll *a*, and dissolved oxygen levels; (c) major ions, specific conductivity, and pH; and (d) other analytes (nitrogen, silica, trace metals, etc.). Interpretation of study results will involve three components: (1) spatial comparison between the 11 Finger Lakes; (2) temporal trends for each lake based upon the current investigation and previous systematic investigations of the Finger Lakes, and (3) discussion of pertinent ambient water quality criteria and possible issues of concern.

As acknowledged by Birge and Juday nearly a decade ago, the Finger Lakes offer an excellent opportunity for comparative studies between similar lake systems. The lakes share similar origins and features, however, there are significant differences with respect to ecosystem structure, land use practices, management activities, etc., which can provide valuable insight regarding system response. This discussion will attempt to look for similarities and dissimilarities between this unique series of lakes.

Temporal comparisons will be limited to the two previous systematic water quality investigations of the Finger Lakes - the pioneering work of Birge and Juday (1914), and collaborative efforts from the late 1960s and early 1970s (Bloomfield, 1978) - and findings from the current investigation. On a cautionary note, comparisons of environmental data sets, collected by different researchers at different times, are notoriously difficult. Variations in station locations, sampling depths, sampling frequency, and analytical methods can confound attempts to detect water quality trends. These issues often interfere with rigorous statistical interpretation. That said, temporal comparisons of environmental data sets is an important process, and can provide some measure of the changes occurring within lake systems.

While the later two objectives (spatial and temporal comparisons) are primarily scientific concerns, it is also important to evaluate ambient water quality conditions within the context of a regulatory context. Thus, findings will be compared to applicable ambient water quality criteria as shown in Table 5.1. The specific criteria will be discussed within the relevant section. Instances of departure from applicable water quality criteria will be highlighted, as will other issues of potential concern within the Finger Lakes.

Table 5.1: Applicable water quality criteria

Parameter	Numerical Limit	Comments
Dissolved Oxygen	water class specific	NYSDEC water quality standard
pH	6.5 – 8.5	NYSDEC water quality standard
Total Phosphorus	20 ug/l	NYSDEC water quality guidance value
Water Clarity	1.2 m	Department of Health criteria for public beaches
Ammonia	based on Temp. & pH	NYSDEC water quality standard
Nitrate + Nitrite	10 mg/l	NYSDEC water quality standard
Sodium	See discussion	Department of Health drinking water criteria
Chloride	250 mg/l	NYSDEC water quality standard
Arsenic	50 ug/l	NYSDEC water quality standard
Lead	50 ug/l	NYSDEC water quality standard
Magnesium	35 mg/l	NYSDEC water quality standard

a. Thermal Characteristics and Vertical Profiles

Thermal stratification is a physical phenomenon which occurs in many lakes and/or reservoirs, and refers to the formation of distinct temperature layers within a water body. The process of thermal stratification is a consequence of the relationship between the temperature of water and its associated density (see further discussion in box below).

While thermal stratification is a physical phenomenon, it has profound effects on (other) physical, chemical, and biological processes within a lake. These effects are largely due to the formidable mixing constraints imposed by thermal stratification. Obviously, mixing constraints strongly influence circulation patterns (physical process) within a lake – in fact, in many ways, the stratified lake begins to behave like two distinct water bodies. The upper portion (or epilimnion) behaves much like a shallower version of the previously unstratified lake with well mixed conditions and efficient gas and thermal exchange with the atmosphere, while the lower portion of the lake (or hypolimnion) begins to "wall off" with little gas and/or thermal exchange with the overlying waters. This transformation from a non-stratified system into a stratified system, results in a cascade of secondary effects (chemical and biological) within the system. For example, this thermal barrier to vertical mixing can play a critical role in determining the level of dissolved oxygen available within the deep waters of a lake. In effect, thermal stratification forms a physical barrier to mixing between the upper layer of the lake (which can receive oxygen from the atmosphere) and the lower layer of the lake (which is unable to receive oxygen input from the atmosphere), thus, precluding oxygen replenishment of the deep waters. If dissolved oxygen demand within the hypolimnion is relatively low, then dissolved oxygen levels remain sufficient to sustain a diverse biota, however, if oxygen demand is high the lower waters become depleted of dissolved oxygen which can adversely effect resident biotic communities and modify chemical cycling within the lake. From a positive perspective, thermal stratification plays a central role in maintaining appropriate temperatures for certain thermally-sensitive organisms (e.g., salmonids). The same thermal barrier responsible for inhibiting oxygen exchange between upper and lower waters also works to limit thermal gain by the lower waters, thus maintaining lower temperatures at depth.

Each of the Finger Lakes, with the exception of Honeoye Lake, undergo prolonged thermal stratification during the growing season. The onset of thermal stratification varies somewhat between the lakes, but usually occurs between mid June and early July. In general, the smaller lakes (Otisco, Canadice, Hemlock and Conesus) stratify earlier in the season, and the larger lakes (Skaneateles, Owasco, Cayuga, Seneca, Keuka and Canandaigua) somewhat later. The reason(s) for this disparity are: (a) the larger lakes require larger thermal inputs than the smaller lakes, (b) the larger lakes are more susceptible to wind induced mixing due to greater widths and longer fetches, which tends to inhibit the process of thermal stratification, and (c) the larger lakes are capable of establishing internal waves, termed seiches, which can also thwart development of stratification. De-stratification, or the break down of thermal stratification, follows a similar pattern during the late fall or early winter in that the smaller lakes de-stratify earlier than do the larger lakes. The governing factor in de-stratification is the rate of thermal loss and the relative quantity of heat stored within the system. De-stratification usually occurs by mid October to early November in the smaller lakes, with the larger lakes following suite by late November to early December. The exact timing of both stratification and de-stratification varies from year to year depending upon the prevailing weather conditions during the given year.

Honeoye Lake, due to its relatively shallow depth and exposure to wind-induced mixing, tends to fluctuate between weakly stratified conditions and de-stratified conditions during the growing season.

Thermal Stratification

The density of water is dependent upon temperature (see figure 5.1 below). The maximum density of water occurs at slightly less than 4 °C. Thus, water with a temperature above or below 4 °C will tend to rise above or float on the denser, underlying water. In addition, on an incremental basis, the density of water changes more quickly as the temperature moves away from 4 °C (see Figure 5.2). These relationships set the stage for a process known as thermal stratification, or the formation of distinct water layers. During thermal stratification the water column "separates" into three distinct layers. The *epilimnion,* or upper layer of water, is characterized by uniform and relatively warm temperatures, continual mixing, and gas exchange with the atmosphere – the depth of this layer is determined by the depth of light penetration. The *metalimnion* (also known as the *thermocline*), or middle layer, is characterized by rapid temperature change per unit change in depth. The *hypolimnion*, or lower layer, is characterized by uniformly low temperatures, limited mixing, and minimal gas exchange with the adjoining layer.

The process of thermal stratification is a "battle" between competing physical processes. At northern latitudes the temperature of a lake during the winter and early spring is fairly uniform, due to low air temperatures and limited solar insolation. This relatively meager solar heating means that any temperature differentials which might arise are easily thwarted by wind-induced mixing. [Some lakes will, on occasion, undergo a period of weak thermal stratification during the winter as a result of ice cover inhibition of mixing.] As the year progresses into late spring and/or early summer, solar input to the lake increases and begins to warm the upper waters. In the absence of sufficient mixing to disperse the heat, this differential warming of the upper waters begins to establish a thermally-induced density barrier between the increasingly warm upper waters (epilimnion) and the colder lower waters (hypolimnion). At this juncture, Mother Nature, becomes the deciding factor on which camp wins out – if the weather turns cloudy, windy, and cold than mixing wins out, whereas, if the weather turns clear, calm, and warm then thermal stratification wins out. Ultimately, however, thermal stratification sets up, and once firmly established, it is able to enhance its edge (e.g., positive feedback mechanism) by increasing the temperature differential between the epilimnion and the hypolimnion. As the year progresses into late fall/early winter and solar input begins to wane, the epilimnion begins to cool and eventually approaches the temperature of the hypolimnion, leading to de-stratification, or the break down of the thermal layers. With the physical barrier to mixing removed, mixing once again dominates the entire system and the water column becomes homogeneous until the cycle is repeated in the spring.

Figure 5.1: Density vs Temperature

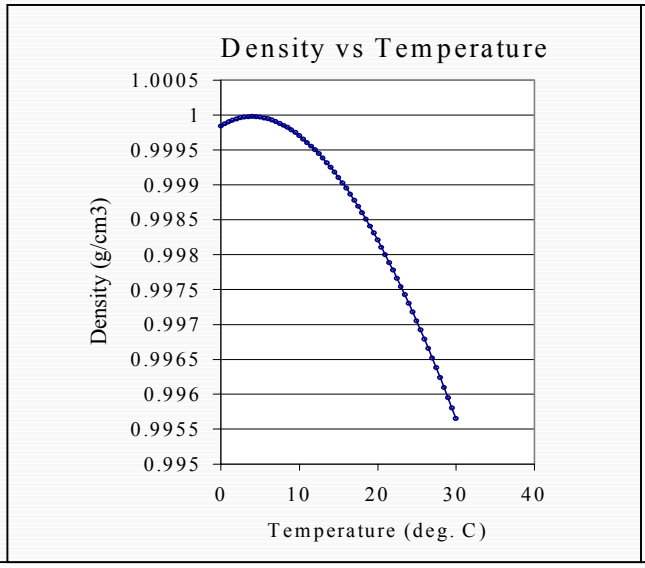
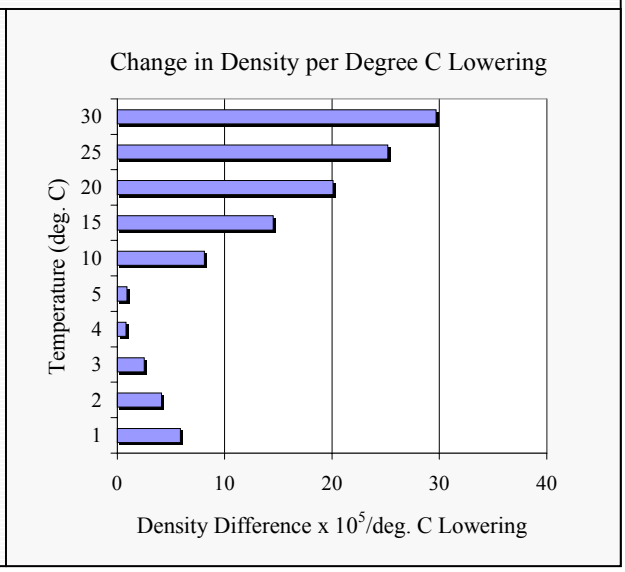


Figure 5.2: Change in density per degree C



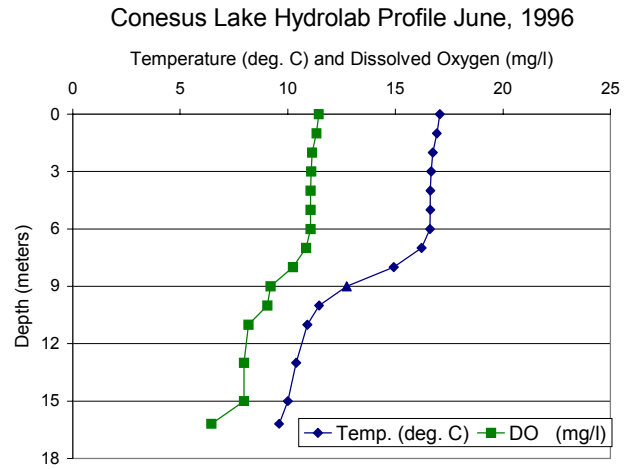
Vertical profiles of temperature and dissolved oxygen representing late spring and mid summer conditions for each of the lakes are presented in Figures 5.3 – 5.6. For purposes of this discussion the reader should focus on the temperature profiles (blue lines). A subsequent section will discuss dissolved oxygen findings (green lines). With the exception of the late summer Skaneateles Lake profile, the measurements presented are from June and August of 1996, and while conditions vary from year to year, these measurements are representative of conditions found during similar time periods in subsequent years. The Skaneateles Lake profile for August is from 1997 due to equipment malfunctions during August, 1996.

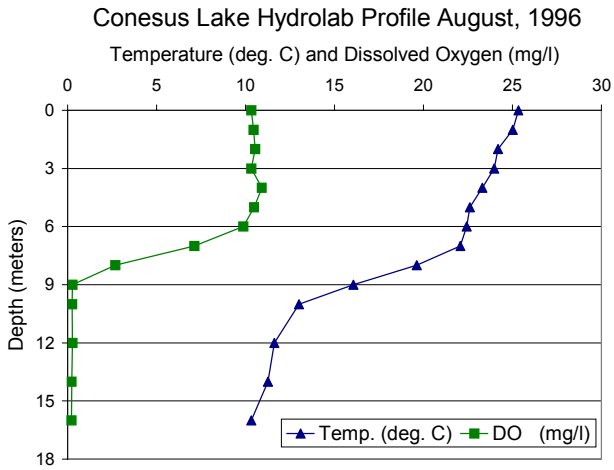
The vertical profiles for Conesus, Honeoye, and Otisco Lakes during June and August of 1996 are shown in Figure 5.3. The Conesus Lake and Otisco Lake profiles provide a good illustration of the progressive enhancement of thermal stratification with time. The June profiles indicate some level of thermal stratification in both lakes, however, the two profiles are somewhat different in structure. Conesus Lake exhibits a more classic profile with a nearly uniform epilimnetic temperature (~ 17 °C) and hypolimnetic temperature (~ 10 °C) and a pronounced thermocline (~ 7 °C change over ~ 3 m). In contrast, Otisco Lake shows a somewhat unusual profile with temperature falling at approximately the same rate throughout the water column - thus, exhibiting a poorly defined thermocline. The August profiles for both Conesus and Otisco Lakes show an enhancement of thermal stratification with a larger differential between epilimnetic and hypolimnetic temperatures, however, as with the June profiles, the Conesus Lake profile is more characteristic of a true thermocline than is the Otisco Lake profile. As expected, given its relatively shallow depths, the Honeoye Lake profiles exhibit only weak thermal stratification during both June and August, with a temperature differential of only about 4 °C between the "epilimnion" and "hypolimnion" during each time period. The terms epilimnion and hypolimnion are probably not appropriate for Honeoye Lake during much of the year.

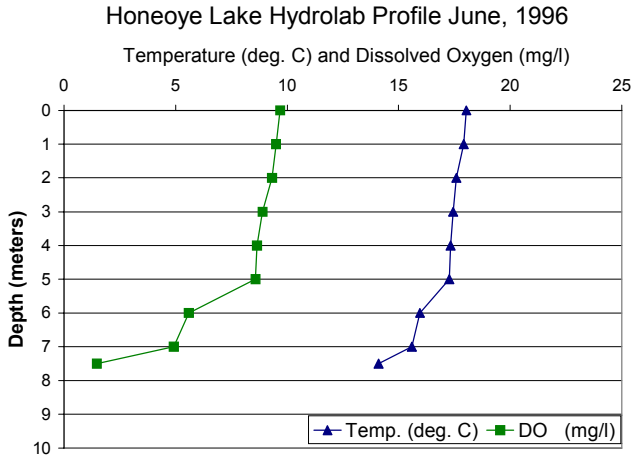
The vertical profiles for Owasco, Cayuga, and Seneca Lakes during June and August of 1996 are shown in Figure 5.4. The June profiles, for each lake, indicate the early stages of thermal stratification as evidenced by the small reduction of temperature with depth. However, thermal stratification in Owasco and Seneca Lakes is somewhat more advanced (note the beginnings of a defined thermocline) than in Cayuga Lake. The Owasco Lake thermocline begins at about 5 m and the Seneca Lake thermocline begins at about 8 m, likely reflecting the relative differences in water clarity (Secchi Disk depths for June, 1996: Owasco = 2.5, Seneca = 4.1). By August, thermal stratification is well established in each of the lakes. The Cayuga Lake and Seneca Lake profiles are nearly identical with the exception that surface temperatures in Seneca are slightly higher. Note the following similarities between the two temperature profiles: (1) boundary between the hypolimnion and the metalimnion (~ 35 m); and (2) lack of a well defined epilimnion – nearly uniform decline in temperature from the surface to the thermocline. The August profile for Owasco Lake is also noteworthy due to the appearance of a secondary thermocline. The primary thermocline starts at ~ 9 m, however, there is a secondary thermocline beginning at ~ 2 m. Secondary thermoclines while not the rule, are not uncommon in freshwater lakes.

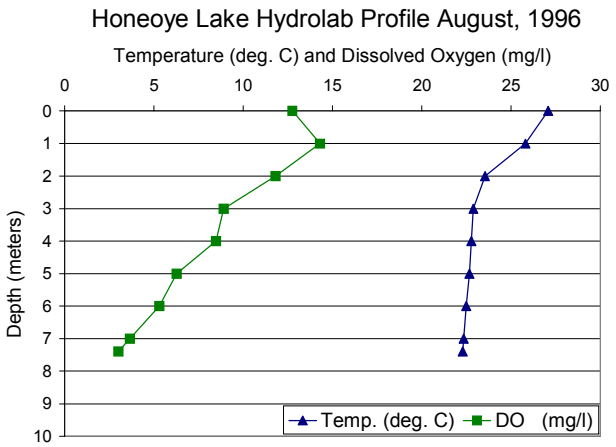
The vertical profiles for Skaneateles, Keuka, and Canandaigua Lakes are shown in Figure 5.5. Note that the August profile for Skaneateles Lake is taken from 1997, due to equipment malfunction in August, 1996 sampling run. The June profiles provide an interesting illustration of the progression of thermal stratification, although it is important to note that this is not a real progression in that the profiles are from different water bodies. Skaneateles Lake is in the very early stages of stratification (note the absence of a discernable thermocline), whereas, stratification on Keuka Lake and Canandaigua Lake is fairly well established as evidenced by well defined thermoclines. A further distinction to be drawn from the latter two profiles is that thermal stratification on Canandaigua Lake is somewhat more advanced than on Keuka Lake in that the thermocline "flattens out". Also, while both lakes show approximately the same temperature differential between epilimnion and hypolimnion (~ 7 – 8 °C), the incremental depth over which this change occurs is substantially different – the temperature change occurs over approximately 8 m of depth for Keuka Lake versus approximately 4 m of depth for Canandaigua Lake.

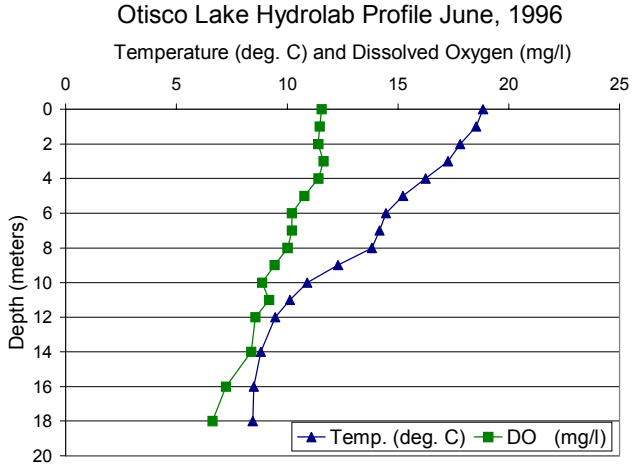
Figure 5.3: Vertical profiles (temperature and dissolved oxygen) for Conesus, Honeoye and Otisco Lakes.











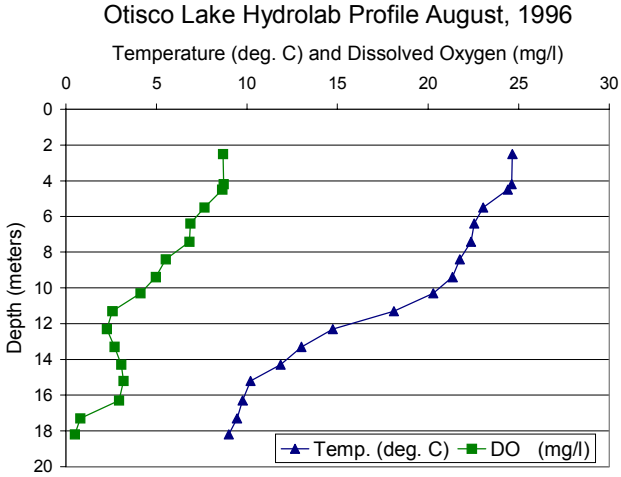
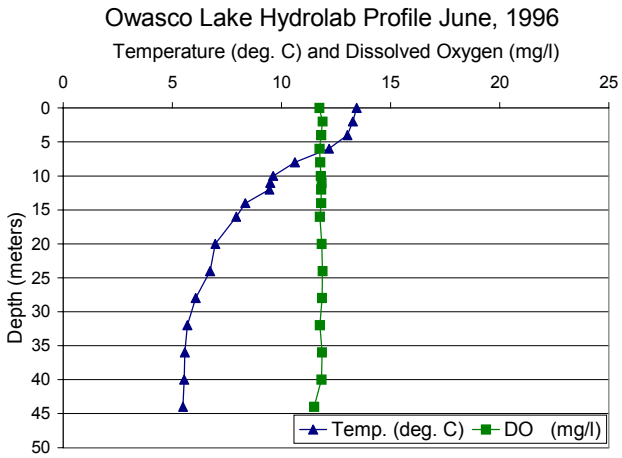
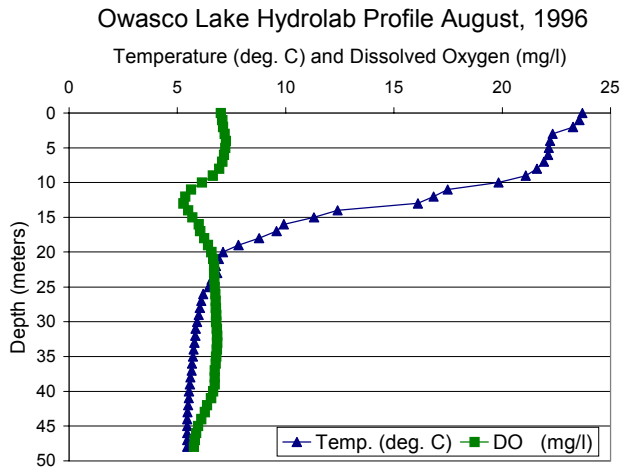
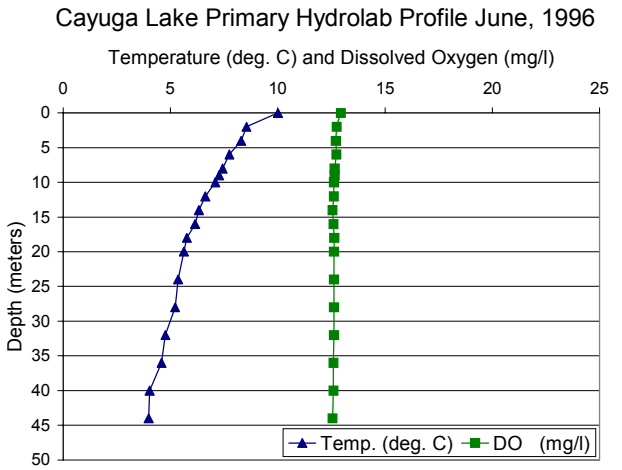
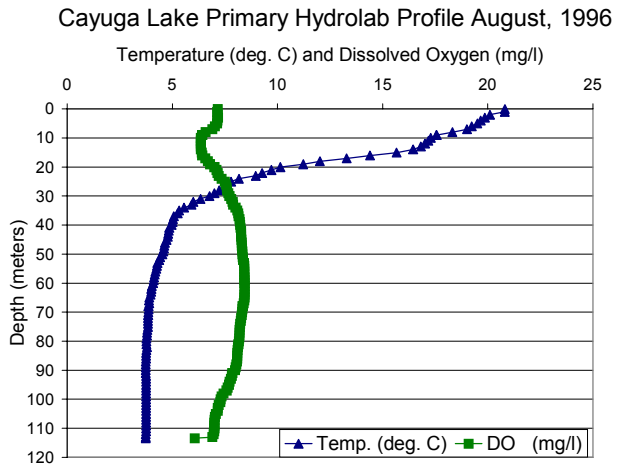


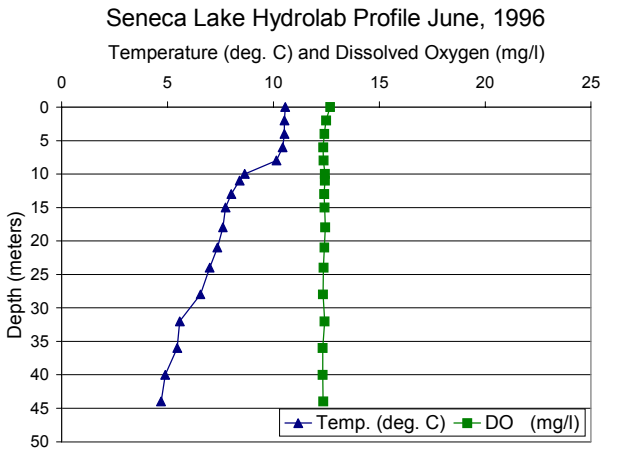
Figure 5.4: Vertical profiles (temperature and dissolved oxygen) for Owasco, Cayuga and Seneca Lakes











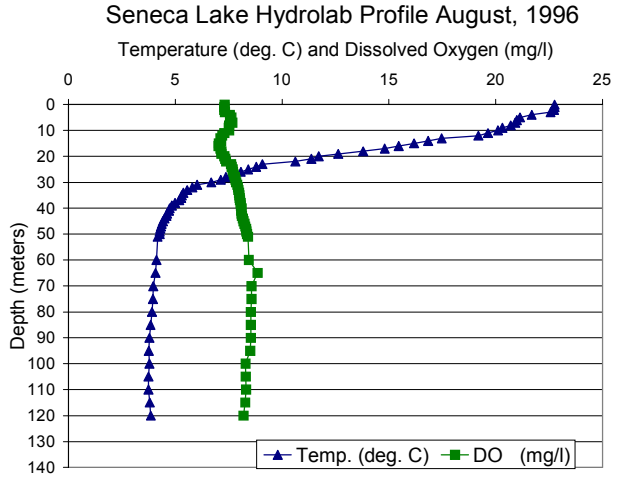
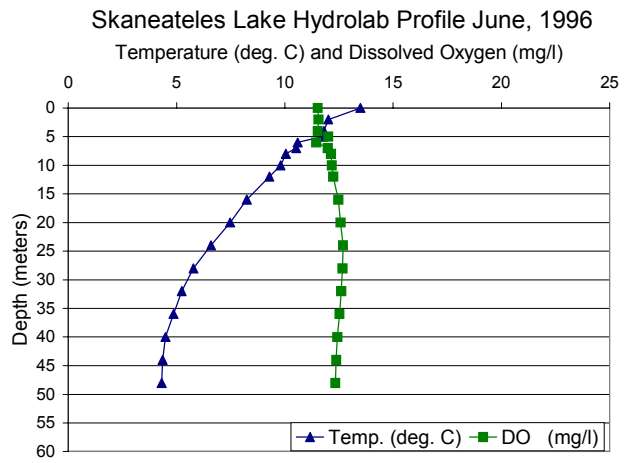
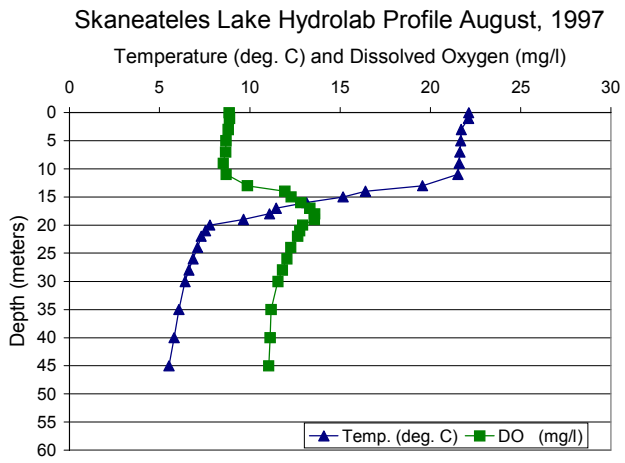
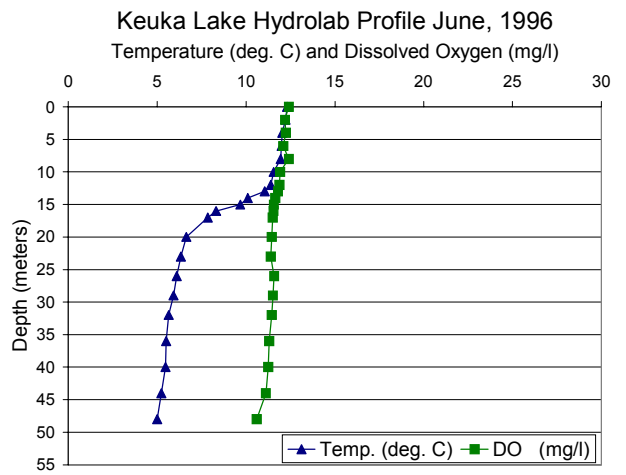
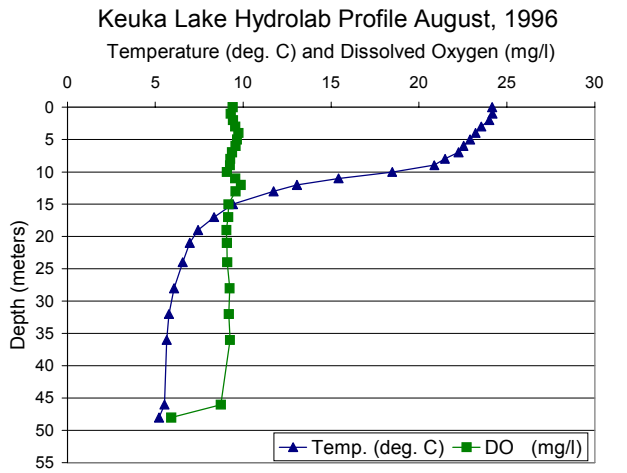


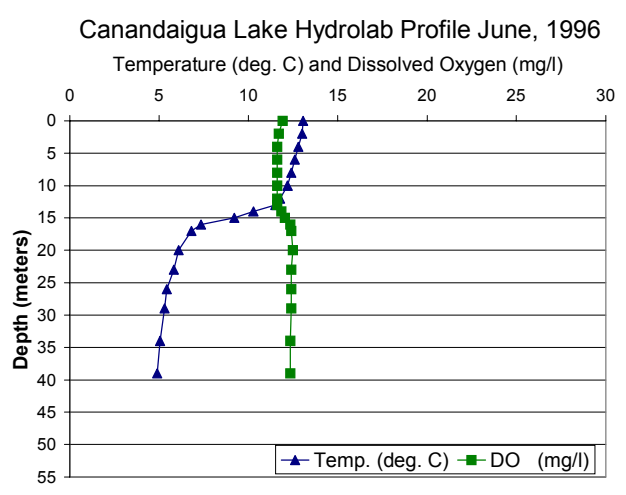
Figure 5.5: Vertical profiles (temperature and DO) for Skaneateles, Keuka and Canandaigua Lakes

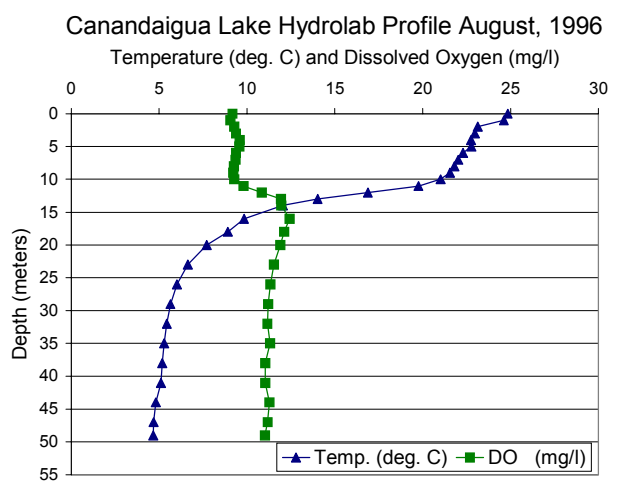








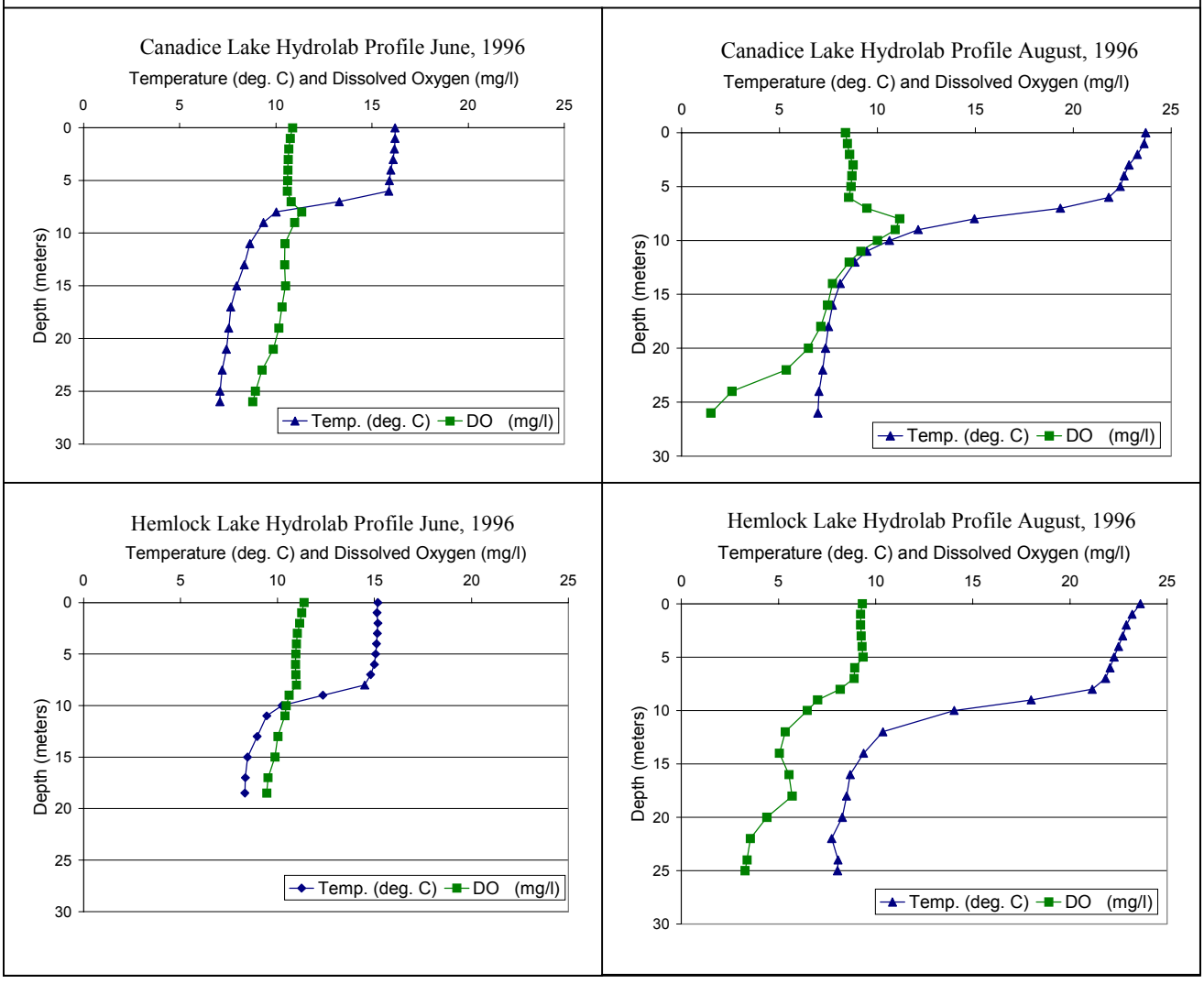




The apparent lag in development of thermal stratification in Skaneateles Lake is likely the result of its remarkable water clarity, and the resultant dispersal of incoming solar heat. By August, thermal stratification is firmly established in each of the lakes, and the temperature profiles are quit similar in each of these lakes, with the exception that Canandaigua Lake exhibits a secondary thermocline within the upper few meters of water.

Vertical profiles for Canadice and Hemlock Lakes during June and August of 1996 are shown in Figure 5.6. The June profiles for both lakes indicate that thermal stratification is fairly well established – note the well defined thermoclines. The thermocline during June is located at approximately 6-9 m and 8-12 m for Canadice and Hemlock Lakes, respectively, with a temperature differential of ~ 5-6 °C between the epilimnion and hypolimnion. The August profiles indicate that thermal stratification remains firmly established within both waterbodies, and that the temperature differential has increased to 12-15 °C.

Figure 5.6: Vertical profiles (temperature and dissolved oxygen) for Canadice and Hemlock Lakes



b. Lake Trophic Indicators

Trophic state is the primary metric used to assess the relative health of freshwater lakes. Trophic state refers to the level of primary productivity for a given water body. Primary productivity, defined as the mass of algae produced within a water body, is estimated by measurements of chlorophyll *a*, the main photosynthetic pigment in algal cells. There is a natural progression in the "life" of a lake from oligotrophy to eutrophy, which is generally measured in thousands of years. However, anthropogenic (human) activities can greatly accelerate the natural "aging" process in what is termed cultural eutrophication. Cultural eutrophication is characterized by increases in nutrient loading and primary productivity. The process can lead to declines in water quality (e.g., decreased water clarity, increased occurrence of algal blooms, and increase production of trihalomethanes in water treatment processes).

Primary productivity in most freshwater lakes in New York State is limited by the macro-nutrient phosphorus (P) - other macro-nutrients include carbon (C) and nitrogen (N). This situation, referred to as "phosphorus limiting conditions", is due to: (1) supply issues: the relative availability of carbon, nitrogen and phosphorus within freshwater aquatic environments; and (2) demand issues: the physiological requirements of these macro-nutrients by phytoplankton. This is analogous to a manufacturing process (e.g., bicycles) in that the number of bikes a company can produce is limited by the *component* in shortest supply. If there are many bicycle frames, handle bars, and so forth, but a limited number of wheels available, the wheel inventory will limit the number of bikes produced. If you increase the wheel supply you can build more bicycles. The supply side of the equation favors phosphorus limitation in lakes. While carbon (in the form of CO_2) and nitrogen (in the form of N_2) are relatively abundant and available in the atmosphere, phosphorus must be derived from terrestrial sources or from internal lake sources. The processes of photosynthesis and nitrogen fixation enable certain organisms to exploit atmospheric sources of carbon and nitrogen, respectively. In apparent contrast, the demand side of the equation would seem to be attempting to balance the situation of phosphorus scarcity by requiring relatively less of this macronutrient. On a weight basis the ratio of carbon, nitrogen, and phosphorus in typical aquatic plant material (algae and macrophytes) is approximately *40 C: 7 N: 1 P* (Wetzel, 1983). Thus, from a physiological perspective, aquatic plants require significantly less phosphorus than carbon and/or nitrogen. However, in the final analysis, phosphorus is most often the limiting nutrient in northern latitude freshwater systems.

While carbon limitations within freshwater lakes are virtually nonexistent, nitrogen limitations can occur. On an empirical basis, studies suggest the following with respect to N:P ratios: (1) N:P > 20 – phosphorus is most likely the limiting nutrient; (2) N:P < 10 – nitrogen is most likely the limiting nutrient; and (3) N:P between 10-20 – difficult to determine the limiting nutrient, and depends upon other factors such as light availability, presence/absence of nitrogen-fixing algae (cyanobacteria), and the forms of nutrients present (Thomann and Mueller, 1987). N:P ratios also play an important role in determining the species of phytoplankton present in a given lake. For example, a low N:P ration provides a selective advantage to nitrogen-fixing algae (e.g., anabaena, etc.) which are generally considered undesirable – these organisms can cause noxious odors and produce toxins which can lead to fish mortality, etc.

Table 5.2 provides summary information regarding N:P and C:P ratios for each of the Finger Lakes. The findings indicate that, on most occasions, phosphorus is the limiting nutrient for primary productivity within the Finger Lakes. Note that the N:P means and the C:P means are all above 20:1 and 40:1, respectively. Furthermore, the findings clearly indicate that carbon is not the limiting nutrient within the Finger Lakes – note that all of the C:P ratio minimums are greater than the stoichiometric ratio of 40:1. However, there do appear to be instances, albeit limited, when nitrogen may become the limiting nutrient in certain of the lakes. This is most probable in some the smaller lakes, namely, Conesus, Canadice, and Honeoye Lakes, as evidenced by the N:P ratio minimums of 14:1, 8:1, and 9:1, respectively. While not presented in the Table 2.3, the N:P ratios for the southern Cayuga Lake site varied significantly, ranging from 13:1 to 151:1, which suggests that the southern-shelf could also, on occasion, be susceptible to blooms of blue-green algae.

Table 5.2: Carbon, nitrogen, phosphorus ratios.

Lake	*Nitrogen:Phosphorus*		*Carbon:Phosphorus*	
	Mean	Range	Mean	Range
Conesus	22:1	14:1 – 39:1	245:1	152:1 – 458:1
Hemlock	50:1	19:1 – 121:1	338:1	192:1 – 980:1
Canadice	41:1	8:1 – 192:1	373:1	250:1 – 560:1
Honeoye	22:1	9:1 – 59:1	188:1	92:1 – 269:1
Canandaigua	78:1	32:1 – 124:1	682:1	254:1 – 2,433:1
Keuka	118:1	15:1 – 155:1	444:1	267:1 – 650:1
Seneca	93:1	18:1 – 266:1	435:1	85:1 – 1160:1
Cayuga	130:1	89:1 – 174:1	348:1	183:1 – 675:1
Owasco	95:1	22:1 – 154:1	316:1	131:1 – 600:1
Skaneateles	241:1	93:1 – 520:1	660:1	150:1 – 1,400:1
Otisco	43:1	23:1 – 71:1	293:1	163:1 – 471:1
cell stoichiometry	7:1		40:1	

Several systems are available for classifying the trophic status of a lake. The conventional system involves segmenting lakes into one of three possible categories (oligotrophic, mesotrophic, and eutrophic) based upon ambient levels of nutrients, primary productivity, water clarity, and hypolimnetic dissolved oxygen levels. Oligotrophic lakes are characterized by low levels of phosphorus, low levels of primary productivity, excellent water clarity, and a well-oxygenated hypolimnion throughout the year. Eutrophic lakes are characterized by high phosphorus levels, elevated levels of primary productivity, poor water clarity, and hypolimnetic dissolved oxygen (DO) depletion - either hypoxia (low DO) or anoxia (no DO). Mesotrophic lakes fall between the other two categories, and are characterized by intermediate levels of phosphorus and primary productivity, moderate water clarity, and moderate levels of hypolimnetic dissolved oxygen. Table 5.3 provides a conventional interpretation of trophic status based upon the most common measures of lake trophic state (EPA, 1974). A significant limitation within the conventional system of classification is the limited number of trophic categories available. This limitation in the conventional trophic system led to the introduction of additional categories (e.g., hypereutrophic) in an effort to further delineate lake trophic status.

Table 5.3: Conventional trophic status indicators (EPA, 1974)

Indicator	**Oligotrophic**	**Mesotrophic**	**Eutrophic**
Total Phosphorus (ug/l)	< 10	10 - 20	>20
Chlorophyll a (ug/l)	< 4	4 - 10	> 10
Secchi Depth (m)	> 4	2 - 4	< 2
Hypolimnetic Oxygen (% of saturation)	> 80	10 – 80	< 10

The Trophic State Index (TSI), a more recent incarnation of lake trophic categorization (Carlson, 1978), was designed to improve upon the previous trophic scheme in several ways, including: (1) a numerical system which provides for a large number of lake classes, thus, more realistically representing the continuum of lake trophic conditions; (2) a numerical approach is also less ambiguous than one based on nomenclature; and (3) linkages are established between the three principal trophic indices (Secchi Disk depth, total phosphorus, and chlorophyll *a*), thus, enabling determination of trophic status from any of the three indicators. The TSI is based on a unitless scale from 0 to 100, with each 10 point increment representing a doubling of biomass. Thus, in certain instances, the TSI can convey a change in lake trophic state where the conventional three-tiered system might not.

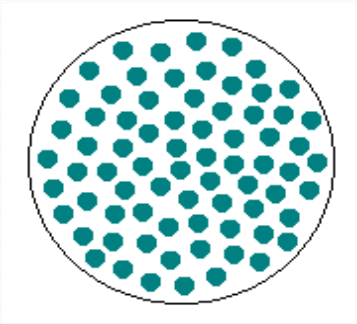
Trophic Indicators

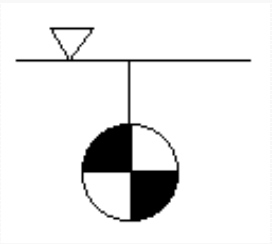
There are four common trophic indicators for freshwater lacustrine systems: (1) phosphorus; (2) chlorophyll a; (3) Secchi Disk depth; and (4) hypolimnetic dissolved oxygen. These four parameters are linked to varying degrees.

The *presumed* linkage between the four trophic indicators (phosphorus, algae, water clarity, and dissolved oxygen) is as follows. *Phosphorus*, assumed to be the limiting nutrient within a lake (see earlier discussion), determines the level of algal productivity within a lake. *Algal* abundance (chlorophyll a), presumed to be the primary limitation on light transmission through the water column, determines *water clarity* (Secchi Disk depth) within the lake. Algal senescence, deposition, and decay, combined with fixed levels of *dissolved oxygen* in the hypolimnion due to thermal stratification, results in the depletion of dissolved oxygen within the hypolimnion. The two possible scenarios for system response are depicted in the figure below: Case 1 - phosphorus levels increase, leading to an increase in algal productivity, which causes a decline in water clarity; and Case 2 - phosphorus levels decline, leading to a reduction in algal productivity, resulting in an increase in water clarity.

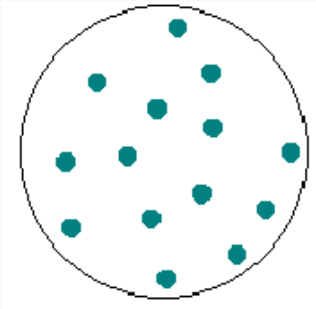
The validity of these linkages is dependant upon the strength of the underlying assumptions. Problems can arise when: (a) phosphorus is not the limiting factor for algal productivity – this would result in a higher TSI (TP) than TSI (chl a); (b) water clarity is controlled by other than algae (e.g., abiotic particulate matter) – this would lead to a higher TSI (SD) than TSI (chl. a) and possibly TSI (TP); and (d) the phosphorus dynamics within the system are significantly disrupted (e.g., Zebra mussel short circuiting) whereby algae productivity is significantly constrained – this would result in a higher TSI (TP) than TSI (SD) and TSI (chl. a').

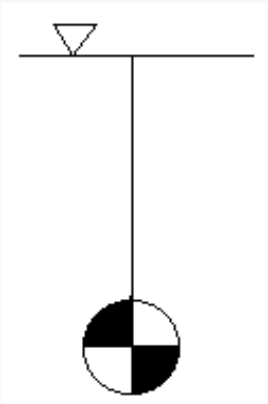
Case 1: P ↑ Chlorophyll a ↑ Secchi Disk ↓





Case 2: P ↓ Chlorophyll a ↓ Secchi Disk ↑





Total Phosphorus

Total phosphorus (TP) levels from the early 1970s and the mid to late 1990s are summarized in Table 5.4. The data represent mean epilimnetic values for the given study periods. The 1990s period excludes 1998 due to analytical irregularities. The 1970s data is derived from Bloomfield (1978) and represents this authors best attempt to summarize data from this period. The individual data points from the 1990s study period are shown in Figure 5.7 and 5.8.

Table 5.4: Mean epilimnetic total phosphorus (ug/l).

Lake Name	1996-99 [1]	Early 1970's [2]
Otisco lake	13.0	9.6
Skaneateles Lake	4.0	6.1
Owasco	12.0	12.0
Cayuga Lake main	9.7	18.0 (1968-70)
Cayuga Lake south	17.2	na
* Seneca Lake	9.8 (7.3)	13.1
Keuka Lake	8.0	13.6
Canandaigua Lake	6.2	11.4
Honeoye Lake	24.2	19
Canadice Lake	8.3	10.2
Hemlock Lake	10.0	9.9
Conesus Lake	22.2	21

1: Current Study – excludes 1998 data due to lab problems.
2: Bloomfield (1978)
*: parenthetical value excludes substantial outlier from 8-97

Spatial comparisons of TP levels within the Finger Lakes indicate substantial variations between the lakes. Mean TP levels range from 4 ug/l in Skaneateles Lake to the greater than 24 ug/l in Conesus Lake. There are no apparent geographic (east – west) patterns to the findings. However, there is some indication of a size-related pattern to the findings, in that the smaller lakes tend to have higher TP levels than do the larger lakes.

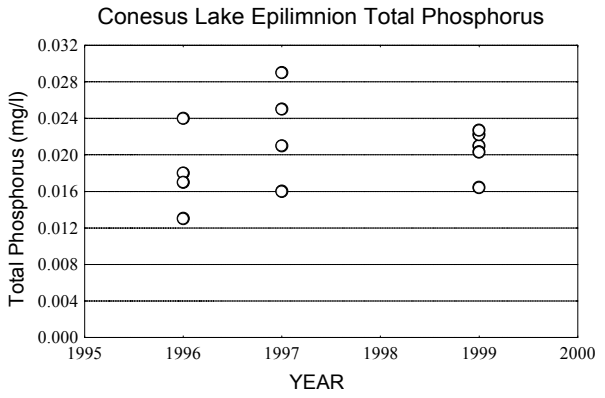
In general, temporal trends in TP concentrations within the Finger Lakes over the last several decades indicate that levels have declined in the larger lakes and have increased or remained static within the smaller lakes. Specific results indicate substantial *reductions* (> 25 percent) in epilimnetic phosphorus levels in Skaneateles, Cayuga (main lake), Seneca, Keuka, Canandaigua, and Canadice Lakes, and substantial *increases* (> 25 percent) in Otisco and Honeoye Lakes. Phosphorus levels have remained *static* in Owasco, Hemlock, and Conesus Lakes. Historical phosphorus data for the southern end of Cayuga Lake was not available, however, the levels observed on the southern-shelf area were significantly higher than those observed during the same time period at the main lake site proximate to Taughannock Point.

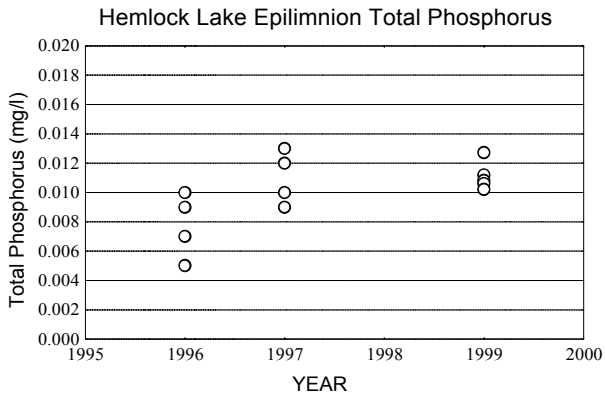
New York State has adopted a guidance value for total phosphorus of 20 ug/l in ponded waters. The value applies to all Class A, A-S, AA, AA-S and B ponded waters that are indexed, except Lakes Erie, Ontario and Champlain. As currently written, the guidance value "is applied as the mean summer, epilimnetic total phosphorus concentration". This number is the average total phosphorus concentration that would be collected from a minimum of one mid-lake, sampling station during the summer growing months." (NYSDEC, 1993).

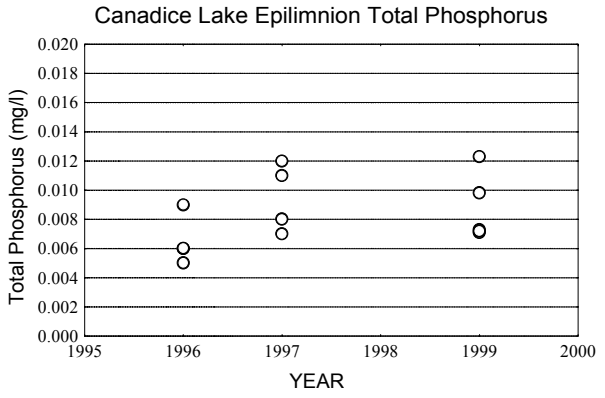
Honeoye Lake and Conesus Lake currently exceed the guidance value for total phosphorus in certain years. Honeoye Lake exceeded the guidance value in 1996 (26.5 ug/l) and 1999 (28 ug/l), while Conesus Lake exceeded 20 ug/l in 1997 (22.8 ug/l) and 1999 (20.5 ug/l). As discussed above, the total phosphorus levels in Honeoye Lake have increased significantly over the past two decades, while total phosphorus levels in Conesus Lake have remained nearly constant. Possible reasons for the observed nutrient pattern changes within the Finger Lakes will be explored below – see trophic state discussion.

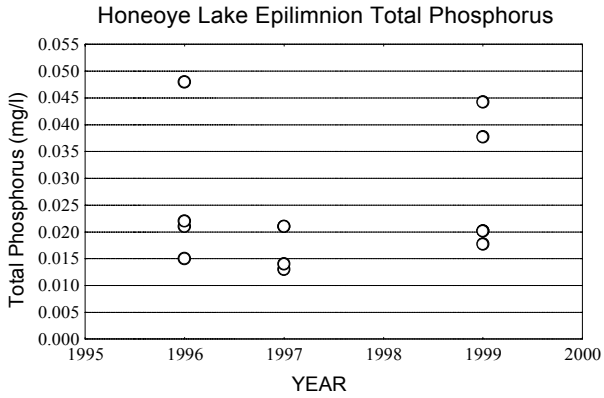
The southern-shelf area of Cayuga Lake is also of concern with respect to total phosphorus levels. The issue of "where" to apply the total phosphorus guidance value should be addressed first. As written, the total phosphorus guidance value is most often applied at the mid-point of a lake. However, given the length of Cayuga Lake (~ 60 m) and the distinct morphology and water classification of the southern terminus, it is deemed appropriate to apply the guidance value to this segment individually. While total phosphorus levels observed within this section of the lake during this study were, on average, slightly below the current NY State guidance value of 20 ug/l, results from other studies (Sterns and Wheeler, 1997 and Upstate Freshwater Institute, 2000) show exceedence of the 20 ug/l guidance value during several years. Data from this investigation were likely biased low due to the location of the monitoring sites (west of lake centerline). The most extensive data on trophic conditions in the south lake is the Upstate Freshwater Institute (UFI) data being collected in association with the Cornell Lake Source Cooling Project. This data set offers the best spatial resolution of total phosphorus levels within the southern shelf. Results from 1998, 1999, and 2000 indicate total phosphorus levels of 26.5 ug/l, 15.9 ug/l, and 19.4 ug/l, respectively (UFI, 2000). It is also apparent that total phosphorus levels observed at the south end of the lake are substantially higher (approximately 2 fold) than those observed at the main lake site to the north. This longitudinal phosphorus gradient, which was also apparent in previous studies (e.g., Sterns and Wheeler, 1997), is due to the spatial pattern of total phosphorus loading to the lake which is heavily influenced by loading to the southern-shelf area. Finally, it is possible that total phosphorus levels within the south lake are exhibiting a downward trend - possibly due to an increase in Zebra mussel infestation within the south lake. While not quantified, field observations indicated a major increase in Zebra mussel population numbers in 1998 and 1999 – significant numbers of young Zebra mussels were observed adhering to aquatic macrophytes within the south lake.

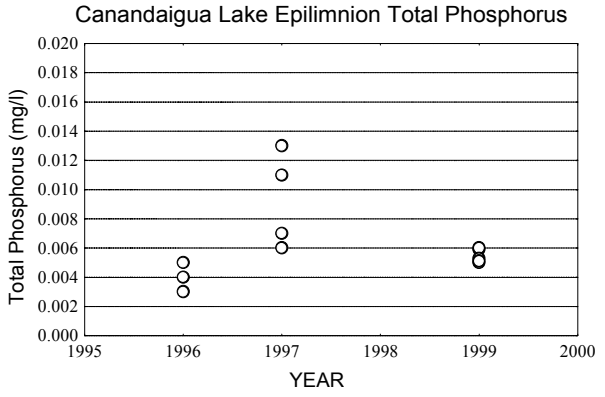
Figure 5.7: Epilimnetic total phosphorus levels in 6 western Finger Lakes – note scale differences











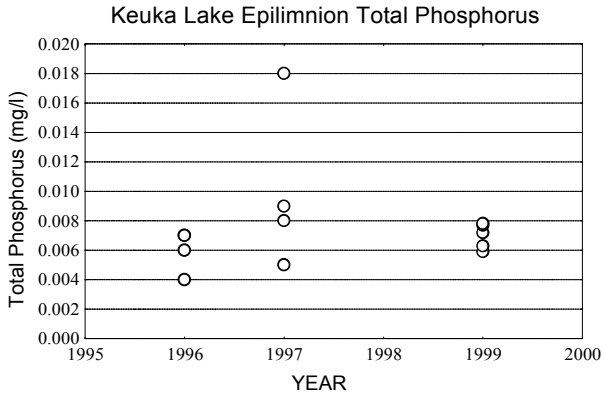
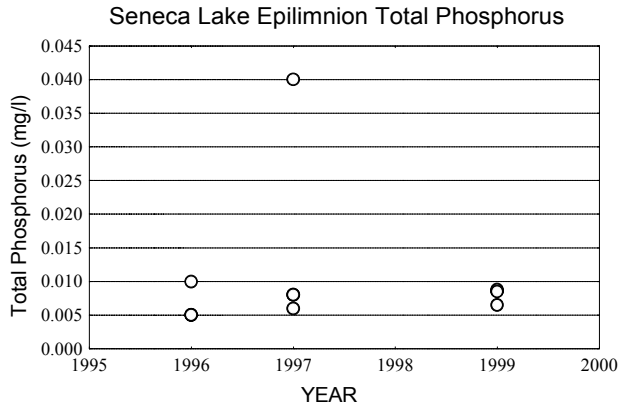
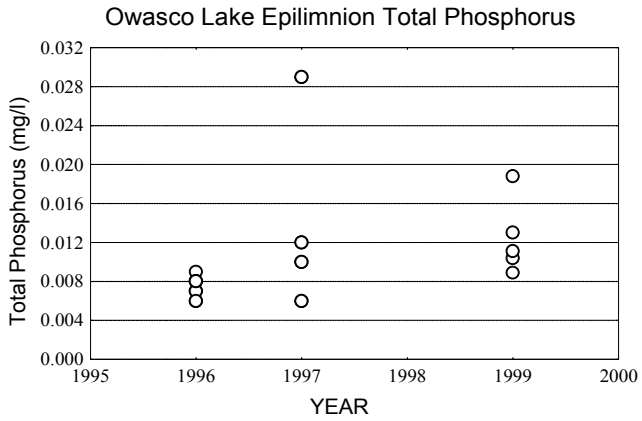
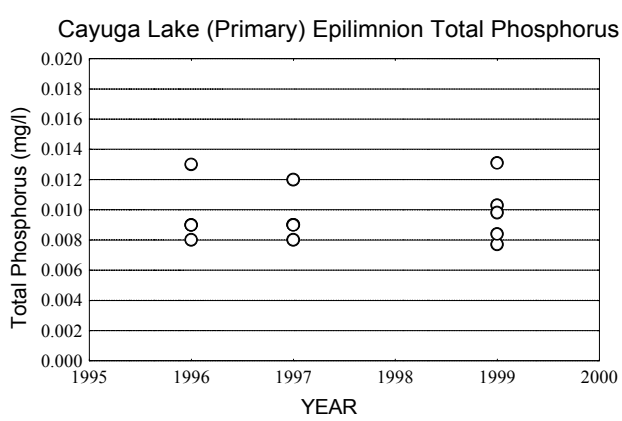
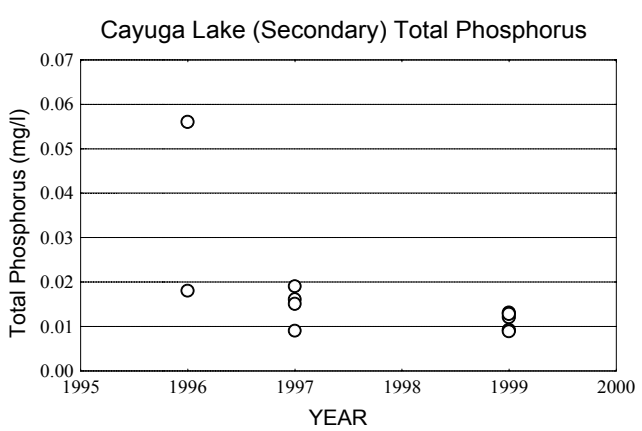


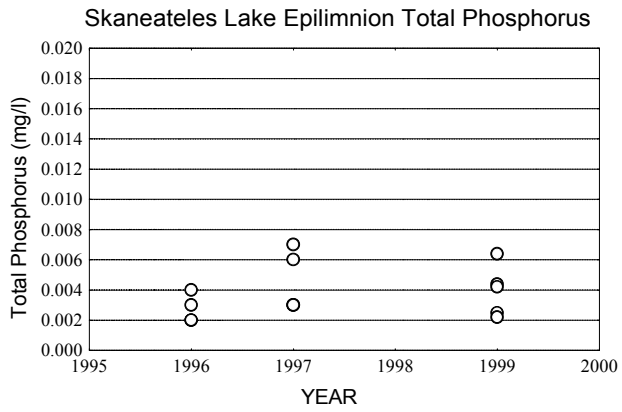
Figure 5.8: Epilimnetic total phosphorus levels in 5 eastern Finger Lakes – note scale differences

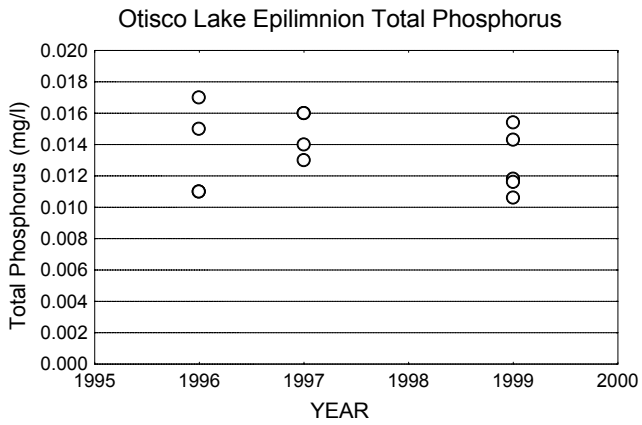












Chlorophyll a

Chlorophyll *a* levels for the two most recent study periods are presented in Table 5.5. The data represent mean epilimnetic values for the given study periods. The 1970s data is derived from Bloomfield (1978) and represents this authors best attempt to summarize data from this time period. Individual data values from the current investigation are presented in Figures 5.9 and 5.10.

Table 5.5: Mean chlorophyll a (ug/l) concentrations

Lake Name	1990s [1]	1970's [2]
Otisco lake	5.3	1.8
Skaneateles Lake	0.7	1.95
Owasco	3.8	5.5
Cayuga Lake main	3.5	4.2
Cayuga Lake secondary	3.1	na
Seneca Lake	2.4	8.8
Keuka Lake	2.8	4.9
Canandaigua Lake	1.0	2
* Honeoye Lake	8.4	25.7
Canadice Lake	2.5	2
Hemlock Lake	3.0	6
Conesus Lake	7.9	na

[1]: Current Investigation
[2]: Bloomfield (1978)
*: questionable value from 1970s

As with TP levels, chlorophyll *a* levels vary substantially across the Finger Lakes. Mean annual chlorophyll *a* concentrations range from less than 1 ug/l in Skaneateles Lake to over 8 ug/l in Honeoye Lake. There is no apparent geographic patterns in the data. However, as with phosphorus levels, there is some indication of a size related pattern in the findings. In general, the larger lakes exhibit lower chlorophyll *a* levels than do the smaller lakes.

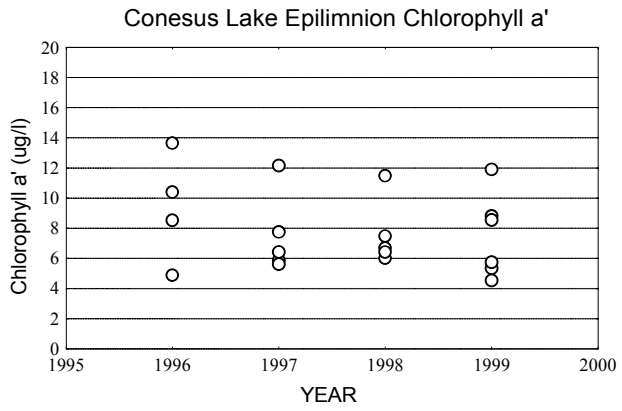
Temporal trends for chlorophyll *a* levels also vary between the lakes. Chlorophyll *a* results indicate substantial reductions (> 25 percent) in Skaneateles, Owasco, Cayuga, Seneca, Keuka, Canandaigua, and Hemlock Lakes, a moderate increase (approximately 25 percent) in Canadice Lake, and a substantial increase (> 200 percent) in Otisco Lake. The value reported from the 1970s for Honeoye Lake appears substantially higher than what would have been expected given the phosphorus and Secchi Disk depths from that era (see discussion of Trophic State Index, below), and would appear suspect.

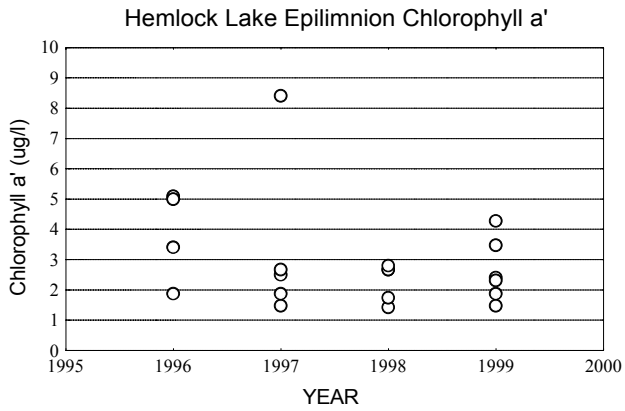
The chlorophyll *a* levels observed in the southern end of Cayuga Lake were, on average, slightly lower than those observed at the main lake site. This is somewhat at odds with the phosphorus findings shown above. However, during the first year (1996) of the investigation, chlorophyll levels were significantly elevated – in fact, the highest recorded value during the study period occurred in the first season. It is hypothesized that these observations are the result of an increase in Zebra mussel populations within the southern end of Cayuga Lake.

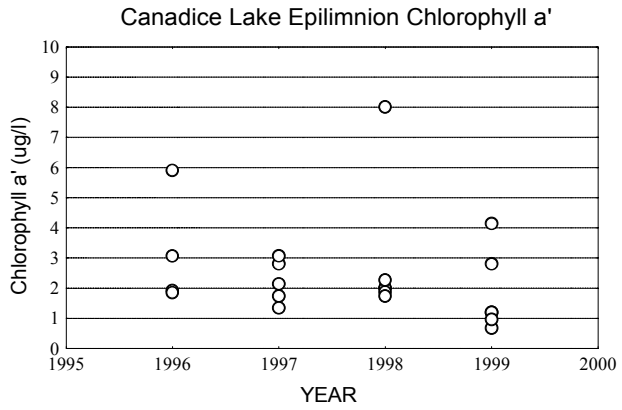
There are no numeric water quality criteria for chlorophyll *a*. However, as discussed previously, chlorophyll *a* (or more appropriately phytoplankton density) can have a significant effect on water clarity. Thus, water clarity criteria may, in certain instances, act as a surrogate criteria for chlorophyll *a* concerns.

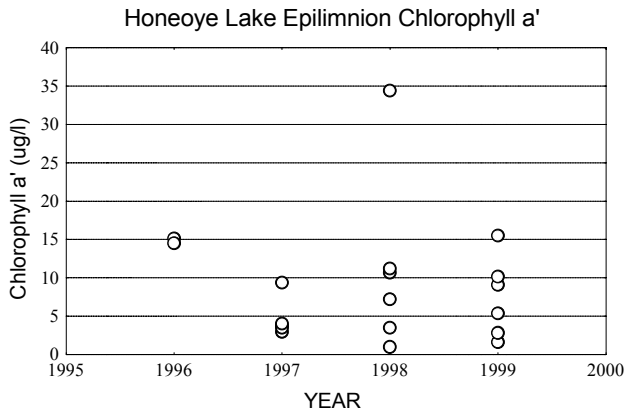
Another issue of concern with respect to phytoplankton populations within the Finger Lakes relates to species composition. As discussed above for the south end of Cayuga Lake, observations suggest that several of the Finger Lakes have experienced a significant increase in Zebra mussel (Dreissena polymorpha) populations during the past several years. An additional water quality concern raised by the presence of Zebra mussels within the lakes is the potential for these organisms to impart a selective advantage to blue-green algae by consuming most other forms of algae but selectively rejecting blue-green algae. Several types of blue-green algae (e.g., Microcystis) produce toxins that can have deleterious effects on aquatic and terrestrial organisms. Microcystis has been associated with bird and fish mortality, as well as instances of gastrointestinal upsets in humans. Thus, it will be important to monitor the progression of Zebra mussels within the lakes and possible changes in phytoplankton composition.

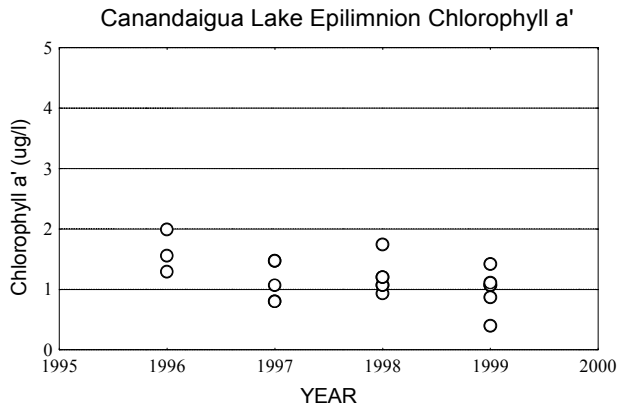
Figure 5.9: Epilimnetic chlorophyll *a* in 6 western Finger Lakes – note scale differences











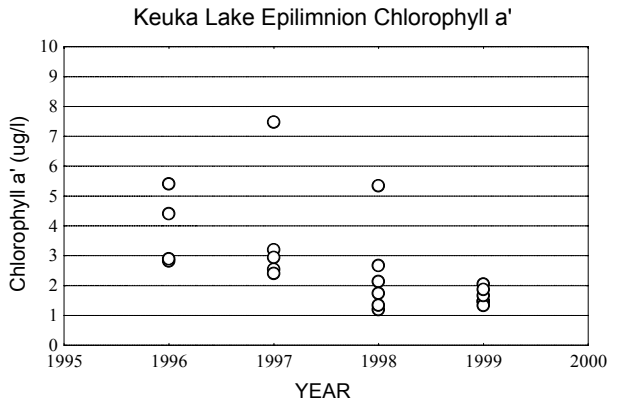
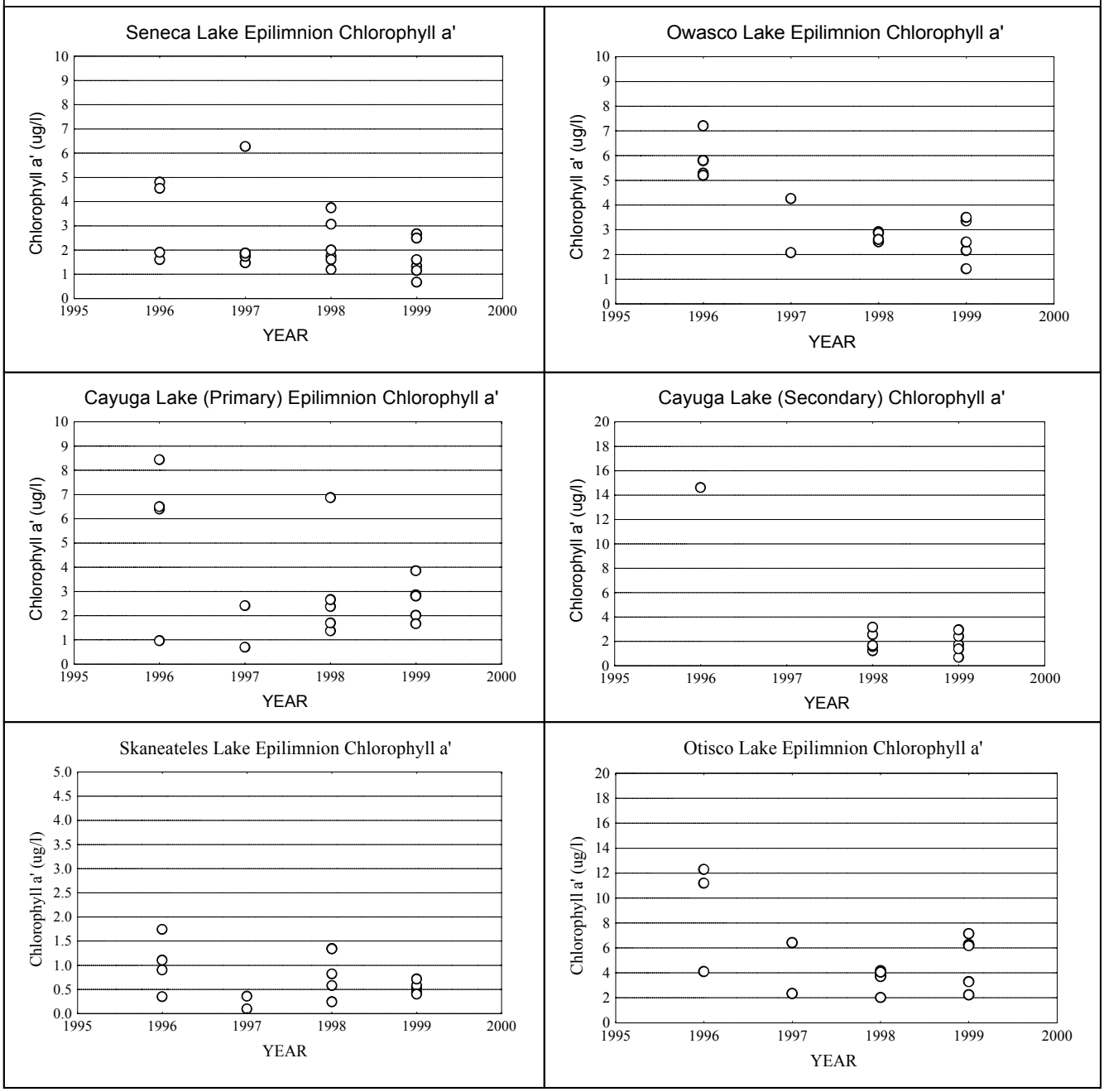


Figure 5.10: Epilimnetic chlorophyll *a* in 5 eastern Finger Lakes – note scale differences



Secchi Disk Depth

Secchi Disk depth values, for the early 1970s and the mid to late 1990s, as well as from 1910, are shown in Table 5.6. The data from the earliest time period (Birge and Juday, 1914), while quite limited (single measurement taken in August of 1910), provides valuable insight concerning historical conditions within the Finger Lakes. However, given the limited number of observations from the 1910 effort, temporal interpretations will be limited to the latter two time periods. Scatter plots of Secchi Disk depth measurements for the 1990s are shown in Figures 5.11 and 5.12.

Table 5.6: Mean Secchi Disk depths (m).

Lake Name	1996-98 [1]	1970's [2]	1910 [3]
Otisco lake	2.0	5.2 *	3.0
Skaneateles Lake	7.6	6.6	10.3
Owasco	2.8	3.1	na
Cayuga Lake main	4.0	3.6	5.1
Seneca Lake	6.0	2.8	8.3
Keuka Lake	5.6	4.7	na
Canandaigua Lake	7.7	4.2	3.7
Honeoye Lake	3.7	3.0	na
Canadice Lake	5.0	5.2	4.0
Hemlock Lake	4.7	3.3	4.7
Conesus Lake	3.7	4.9	6.3

[1]: Current Study
[2]: Bloomfield (1978)
[3]: Birge & Juday (1914) – limited to a single measurement in August, 1910
*: Thought to be anomalous (Effler, 1989)

As with TP and chlorophyll *a* levels discussed earlier, spatial comparisons of mean Secchi Disk depths indicate significant differences in water clarity levels across the Finger Lakes. Mean Secchi Disk depths range from 2 m in Otisco Lake to in excess of 7 m in Skaneateles and Canandaigua Lakes.

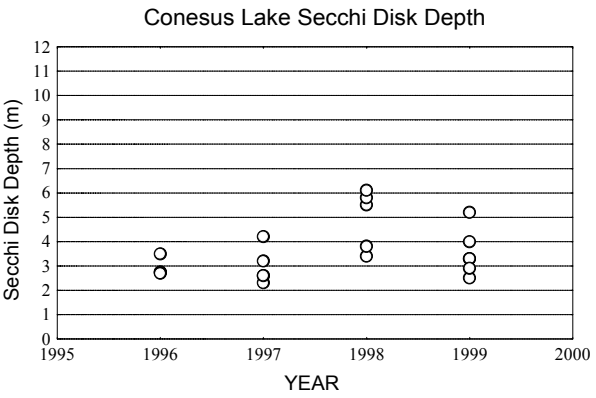
Temporal comparisons of Secchi Disk depth trends over the last several decades are generally consistent with the other two trophic indicators presented above (although inversely related), in that the larger lakes show marked increases in water clarity over the intervening time frame while the smaller lakes indicate stable or declining levels of water clarity. Lake specific findings are as follows. Seneca, Canandaigua, and Hemlock Lakes have shown a *substantial increase* (> 30 percent) in water clarity during the intervening time period. Skaneateles, Cayuga (primary site), Keuka, and Honeoye Lakes underwent more *modest increases* (10 – 20 percent) in water clarity. Owasco Lake and Candice Lake remain basically unchanged, and Conesus Lake has shown a *substantial reduction* (~ 30 percent) in water clarity.

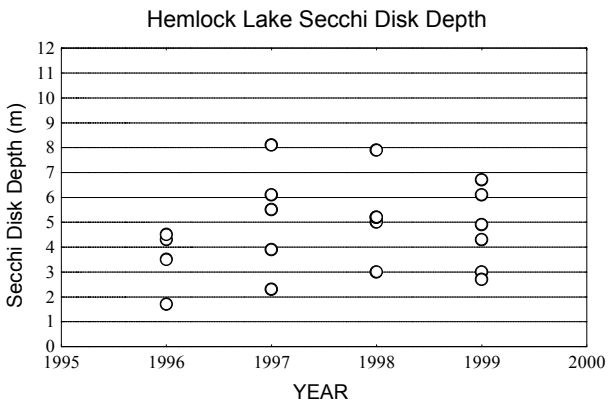
There are two caveats which should be noted in the discussion of water clarity trends. First, the Secchi Disk depth reported for Otisco Lake during the 1970s, while listed, is thought to be anomolous (Effler, 1989a) given historical observations in the lake. For example, note that the Secchi Disk depth recorded in 1910 is significantly lower than the 1970s value. Second, the Secchi Disk measurements for the south Cayuga site were compromised due to shallow water depths. On several occasions, the Secchi Disk depth exceeded the station depth, thus, precluding accurate measurement of Secchi Disk depth.

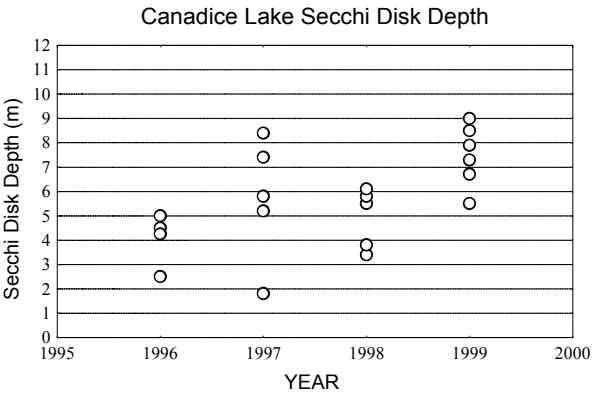
The New York State Department of Health requires a minimum water clarity of 4 feet (1.2 m) for *new* public swimming beaches within the state. As is apparent in Figure 5.12,, both Otisco Lake and the south end of Cayuga Lake (Cayuga Secondary), on occasion, show Secchi Disk depths of less than 1.2 m. As was the case with total phosphorus and chlorophyll *a*, the southern Cayuga site appears to be experiencing a significant change (greater water clarity) likely due to Zebra mussel infestation. There are no public swimming beaches currently in place on either Otisco Lake or at the south end of Cayuga Lake. In the case of Cayuga Lake, the public beach at the southern end of the lake was officially closed approximately 40 years ago due to water clarity issues and other concerns, and remains closed today.

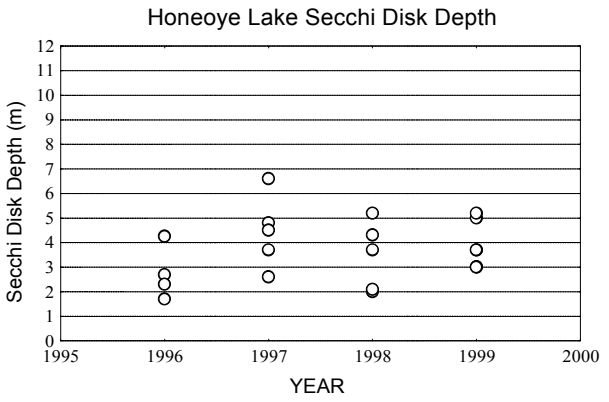
During the first two years of this investigation a team of scientists from the Upstate Freshwater Institute conducted an intensive study of the optical properties of the Finger Lakes (Effler, et al., 2000).

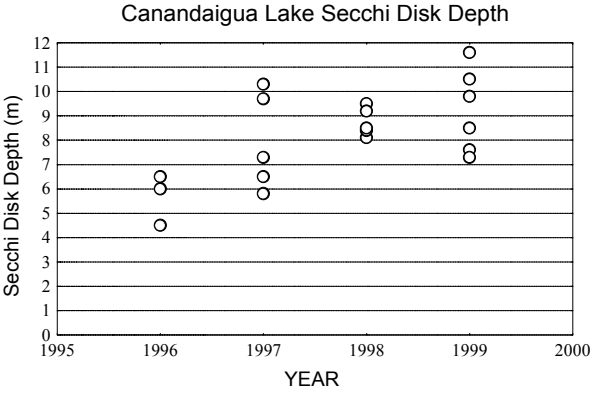
Figure 5.11: Secchi Disk Depths during the 1990s in 6 western Finger Lakes











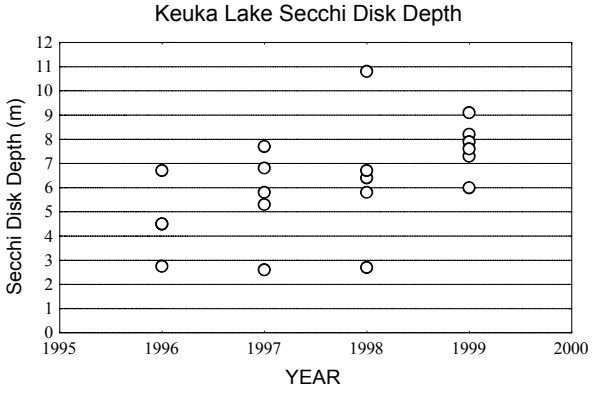
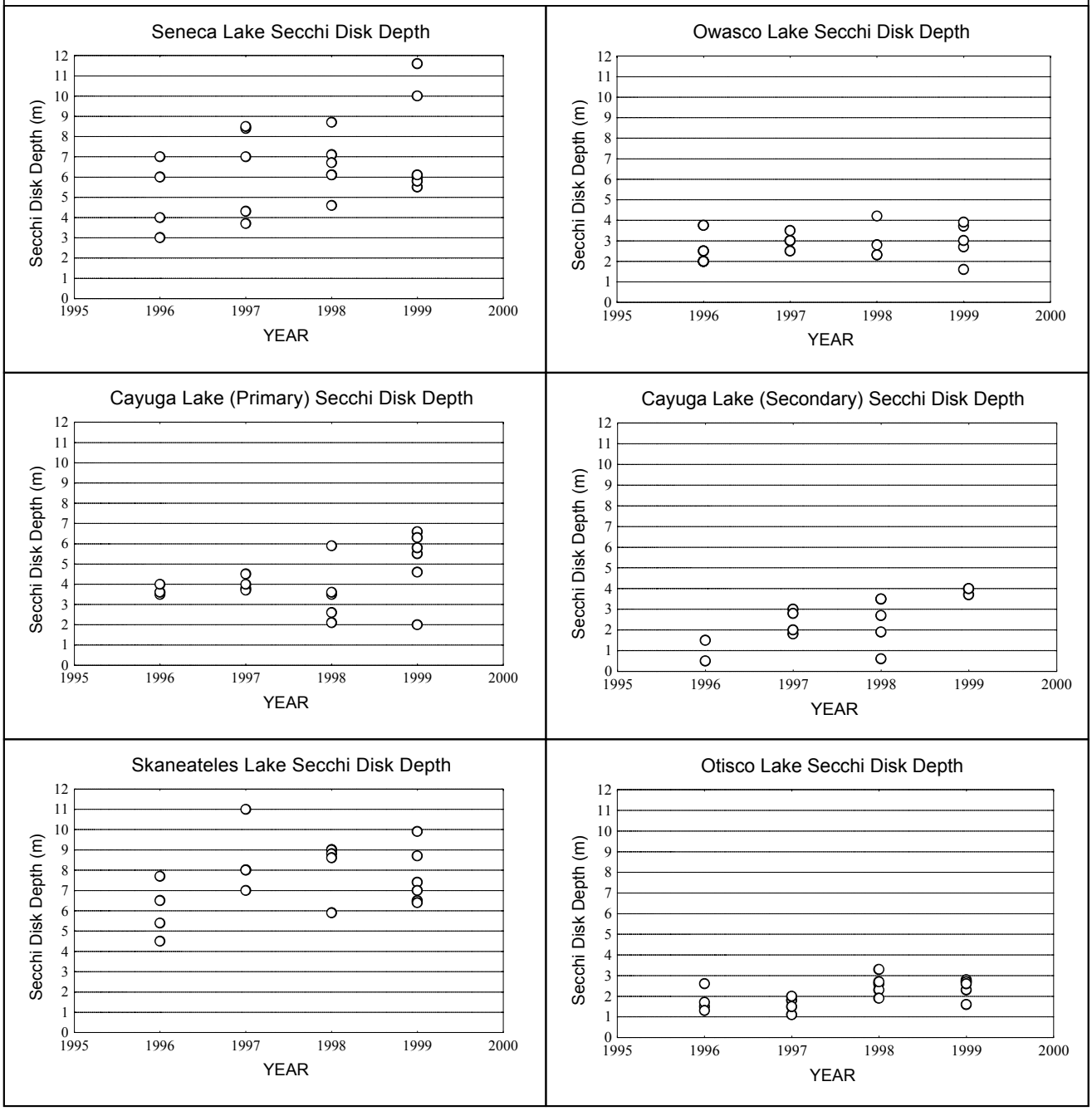


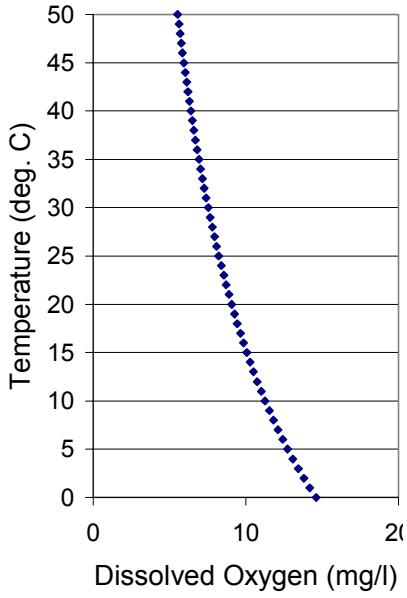
Figure 5.12: Secchi Disk Depths during the 1990s in 5 eastern Finger Lakes



Hypolimnetic Dissolved Oxygen

The final parameter which is frequently used to determine the trophic status of a lake is the level of dissolved oxygen (DO) in the hypolimnion. Oxygen is more soluble in cold water than in warm water (see Figure 5.13). Thus, all other factors being equal, the colder the water the higher the level of dissolved oxygen. However, increasing trophic levels can lead to decreasing dissolved oxygen levels in the hypolimnion (colder waters) in a process referred to as DO depletion.

Figure 5.13: DO vs Temperature



The nomenclature for dissolved oxygen depletion include the terms: (1) *anoxia* – which is defined as a complete absence of oxygen; and (2) *hypoxia* – which is defined as reduced levels of oxygen. DO depletion within the hypolimnion of a lake is the result of several factors, including: (a) lake stratification - which creates a thermal/density barrier to oxygen transfer between the epilimnion and the hypolimnion of a lake – thus, inhibiting reoxygenation of hypolimnetic waters; (b) algal senescence - which results in the settling of organic matter, decay, and exertion of DO demand within the hypolimnion; (c) benthic sediment oxygen demand – which exerts additional DO demand within hypolimnetic waters; and (d) morphological factors such as the volume of the hypolimnion relative to the epilimnion – cone shaped basins are more susceptible to hypolimnetic DO depletion than are box shaped basins.

The dissolved oxygen curve for a given lake will fall between two possible extremes. An *orthograde curve*, characteristic of oligotrophic lakes, which shows increasing DO levels with depth (see the August DO profiles for Skaneateles and Canandaigua Lakes in Figure 5.5 above) and is indicative of the inherent relationship between DO and temperature. On the other extreme, is the *clinograde* curve, characteristic of eutrophic lakes, which shows decreasing DO levels with depth (see the August DO profiles for Otisco and Conesus Lakes in Figure 5.3 above) and is indicative of hypolimnetic DO depletion.

As indicated, Otisco Lake and Conesus Lake (see August profiles in Figure 5.3) both exhibit a sustained clinograde dissolved oxygen curve from early summer through mid-fall, with well established anoxic conditions occurring within the hypolimnion from mid-summer until fall turnover. Honeoye Lake also exhibits a fairly consistent clinograde dissolved oxygen curve (see Figure 5.3) from early-summer until mid-fall, although DO levels do not fall quite as low as in Otisco and Conesus Lakes, and are best characterized as hypoxic conditions.

Owasco, Cayuga, and Seneca Lakes (see Figure 5.4) all exhibit nearly uniform dissolved oxygen levels with depth, or a slight orthograde curve, with fairly high DO levels throughout the growing season. Both Owasco Lake and Cayuga Lake show a somewhat pronounced DO minima within the metalimnion. This is not atypical of mesotrophic lakes (see discussion to follow) and is indicative of reduced settling rates and resultant levels of DO depletion due to density differences as discussed above.

Skaneateles Lake and Canandaigua Lake once again demonstrate their similarities in that both lakes exhibit classic orthograde dissolved oxygen curves (see Figure 5.5) characterized by a distinct increase in dissolved oxygen levels within the hypolimnion reflecting the relationship between water temperature and oxygen solubility (absent significant DO depletion). The dissolved oxygen profile for Keuka Lake during August (see Figure 5.5) is more consistent with those of Owasco, Cayuga and Seneca Lakes (see Figure 5.4) in that DO levels remain nearly constant throughout the water column.

The dissolved oxygen levels observed during the present investigation are similar to levels observed during the late 1960s and early 1970s.

The dissolved oxygen standard for class AA, A, B, C, AA-special waters (portions of which are applicable to all of the Finger Lakes) reads as follows:

> "For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/L from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/L, and at no time shall the concentration be less than 5.0 mg/L. For nontrout waters, the minimum daily average shall not be less than 5.0 mg/L, and at no time shall the DO concentration be less than 4.0 mg/L.." (NYSDEC, 1999).

A strict interpretation of the dissolved oxygen standard (e.g., throughout the entire water column) would indicate that each of the smaller Finger Lakes (Otisco, Honeoye, Canadice, Hemlock, and Conesus Lakes) contravene the dissolved oxygen standard within the hypolimnion during late summer. However, at least in the case of Candice and Hemlock Lakes, which have quite restrictive watershed controls, the observed DO depletion might well be a natural phenomenon. The case is not as clear for the other three lakes in that watershed controls are less restrictive than for Hemlock and Canadice Lakes. Furthermore, in the case of Otisco Lake and Conesus Lake the DO depletion rate is more pronounced than in Honeoye, Canadice and Hemlock Lakes. The cause(s) of dissolved oxygen depletion (natural versus human induced) can not be determined at this juncture.

The consequences (ecological, chemical, etc.) of DO depletion within the hypolimnion of freshwaters is not entirely clear. Significant concerns have recently been expressed regarding DO depletions in coastal saline waters (e.g., Gulf of Mexico, Long Island Sound, etc.), and a significant body of information has been developed concerning this issue in coastal waters (Annin, 1999). Unfortunately, similar information concerning DO depletion in freshwater lakes is not available. Some of the issues which may be of concern include: (a) chemical concerns - such as solubilization of certain compounds (e.g., sulfides, arsenic, etc.) which are more soluble under reduced conditions, and (b) biological concerns such as increased production of methyl-mercury, effects on resident biota, etc.

Trophic State Discussion

Trophic states within the Finger Lakes vary significantly, ranging from clearly oligotrophic conditions within Canandaigua and Skaneateles Lakes to eutrophic conditions within Otisco, Honeoye, and Conesus Lakes. Using the conventional classification scheme outlined earlier, the trophic state of the individual Finger Lakes break out as shown in Table 5.7. For the most part, this would suggest little change in trophic status for the lakes since the 1970s. However, this conclusion is due, to some degree, to the relatively coarse nature of the conventional trophic scheme (see previous discussion). Use of the more finely scaled Carlson Trophic State Index indicates some significant changes in some of the lakes.

Table 5.7: Trophic state of the Finger Lakes based on conventional trophic classifications

Oligotrophic		**Mesotrophic**	**Eutrophic**
Skaneateles	Cayuga		Otisco
Canandaigua	Seneca	Owasco	Honeoye
	Keuka		Conesus
	Hemlock		
	Canadice		

TSI values derived from trophic indicator measurements of the 1970s and the 1990s are presented in Table 5.8. The table presents both parameter-specific mean TSI values and the variation is TSI values for individual observations. For example, Skaneateles Lake had a mean TSI (SD) of 31 during the late 1990s, while individual TSI (SD) values ranged from 25-38 during that timeframe. The range provides an indication of how the TSI has varied over the given timeframe. However, it is also influenced by the number of observations available at the monitoring site – in general, the more observations the greater the variability. Thus, it would be best to limit inter-lake comparisons to the later time period as they involved approximately the same number of observations.

Table 5.8: Historical comparison of Carlson Trophic State Indices

	TSI (SD)		TSI (TP)		TSI (chl. a')	
Lake	1971-73 [1]	1996-99	1971-73 [1]	1996-99	1971-73 [1]	1996-99
Otisco	36 *	49 (43-59)	37	41 (38-44)	36	47 (37-52)
Skaneateles	35 (30-36)	31 (25-38)	30 (26-48)	24 (14-32)	37 (32-40)	27 (8-36)
Owasco	44 (41-47)	45 (39-53)	42 (33-41)	40 (30-53)	47 (46-49)	44 (34-50)
Cayuga (main)	42	40 (33-50)	46	37 (34-41)	45	43 (27-51)
Seneca	45 (42-52)	33 (25-44)	44 (33-44)	37 (27-57)	52 (46-56)	39 (27-49)
Keuka	38 (32-47)	34 (26-46)	42 (37-38)	34 (24-46)	46 (36-51)	41 (32-50)
Canandaigua	39	30 (25-35)	39	30 (20-41)	37	31 (22-38)
Honeoye	44	50 (33-50)	42	50 (40-60)	62	51 (30-65)
Canadice	36	35 (28-52)	38	35 (27-41)	37	40 (27-51)
Hemlock	43 (39-46)	37 (30-48)	37 (32-34)	37 (27-41)	48 (46-50)	41 (34-51)
Conesus	37	42 (34-48)	48	49 (41-55)	27	51 (45-56)

Note: mean value with range, where appropriate, in parentheses

[1] From Lakes of New York State (1978)

* There are some indications that this value may be biased low (Effler, 1989).

In general, results indicate that trophic conditions in the Finger Lakes have followed one of two possible scenarios over the past 30 years. The trend in most of the larger lakes has been toward lower nutrient levels, greater water clarity, and lower levels of primary productivity over the intervening period – this is generally viewed as a positive development. In contrast, the trend in the smaller lakes is indicative of either static or somewhat more productive conditions. Exceptions to these trends are Owasco Lake for the larger lakes and Hemlock Lake for the smaller lakes. In the case of Owasco Lake, trophic conditions are nearly the same as were observed in the early 1970s. In the case of Hemlock Lake, current findings indicate increased water clarity and decreased productivity, although phosphorus levels appear to have remained nearly constant. The obvious question raised by this apparent bifurcation in lake trends is "*what factors are responsible for the observed divergence in lake trophic trends* ?".

It is hypothesized that the trend differences observed in trophic state within the Finger Lakes over the past several decades are attributable, in part, to the relative role of *external* and *internal* phosphorus loading in the given lakes. Furthermore, it is proposed that *hypolimnetic dissolved oxygen depletion* in the smaller Finger Lakes acts to constrain trophic reductions in those lakes by triggering the release of phosphorus from the benthic sediments.

Phosphorus inputs to a lake can come from either external sources (watershed and or atmosphere) or internal sources (benthic sediments). External sources of phosphorus can be of natural (e.g., geological) and/or anthropogenic (e.g., agricultural runoff and municipal wastewater) origins. For phosphorus limited lakes, the phosphorus load to the lake, coupled with other factors (e.g., lake morphology, dissolved oxygen levels, etc.) determine the trophic state of the lake. The magnitude of phosphorus loading to a lake, the identification of contributory sources, and the relative contribution from external and internal sources are all important factors in the management of lake water quality.

Over the past several decades a number of factors have contributed to reductions in *external* loading of phosphorus to waterbodies in New York State. *First*, the construction and improvement of wastewater treatment facilities has brought significant reductions in the discharge of phosphorus to receiving waters. There have been significant improvements in the chemical, biological, and physical methods of phosphorus removal from domestic and industrial wastewater. Basic secondary treatment is capable of removing up to 30 percent of the phosphorus in domestic sewage, while advanced treatment can achieve significantly higher levels of phosphorus removal. *Second*, many states, including New York, instituted phosphorus detergent bans during the last few decades, which have also exerted a downward trend in phosphorus loading to receiving waters. For example, in 1976, New York State implemented the following restrictions on the use of phosphorus (Part 659 ECL - NYSDOS, 1999):

"No household cleansing product except those used in dishwashers, food and beverage processing equipment and dairy equipment shall be distributed, sold, offered or exposed for sale in this State which shall contain a phosphorus compound in concentrations in excess of a trace quantity measured as elemental phosphorus".

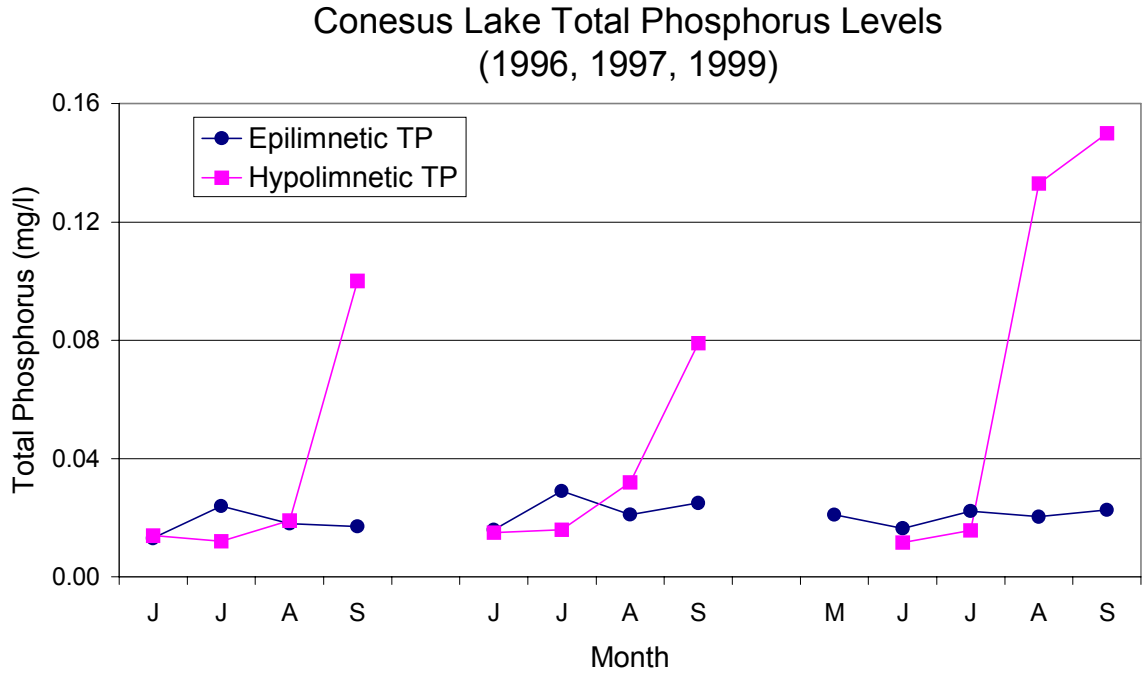
Third, the implementation of Best Management Practices (BMPs) in agricultural operations have also contributed to reductions in phosphorus loading from diffuse, or non-point sources. Other factors, such as land use changes also influence nutrient loading to the lakes, although the direction of change probably varies. In aggregate, it is probable that external phosphorus loading to the Finger Lakes has declined over the past 30 years.

It is possible that the water quality management measures described above have conspired to cause the observed divergence in trophic state changes within the Finger Lakes over the past several decades. However, given the apparent correlation between trophic state trend and hypolimnetic dissolved oxygen conditions, it would seem more probable that the observed trends are a function of both external controls, such as those mentioned above, and internal system dynamics.

It is fairly well established that eutrophic lakes which experience extensive episodes of hypolimnetic dissolved oxygen depletion, exhibit substantial phosphorus release (internal loading) from benthic sediments (Mortimer, 1941). This phenomenon, believed to be biochemically mediated, is the result of reduction/oxidation (redox) related processes occurring at the sediment-water interface. Phosphorus tends to bind with iron and other cations under oxidative conditions, and thus, tends to precipitate out of solution. However, reducing conditions can trigger a de-coupling of phosphorus, and allow it to reenter solution. The end result is that under depressed DO conditions phosphorus is "released" from the bottom sediments to the overlying water column. Thus, while external loading to the Finger Lakes have likely declined over the past 30 years, internal phosphorus loading within the smaller eutrophic lakes may be acting to offset declines in the smaller lakes. This internal phosphorus cycle is quite apparent in Conesus Lake as evidenced by the difference in mean phosphorus levels in the epilimnion versus the hypolimnion (see Figure 5.14). The average phosphorus level within the epilimnion of Conesus Lake during the past several years is 22 ug/l, while the average phosphorus level within the hypolimnion over the same time period is approximately 50 ug/l.

In contrast to Conesus Lake, the other two eutrophic lakes (Honeoye and Otisco Lakes) showed little difference between epilimnetic and hypolimnetic phosphorus concentrations. This is not surprising for Honeoye Lake given the tenuous nature of thermal stratification within the lake and the fact that our operational definition of epilimnion (Secchi Disk depth) and hypolimnion (two thirds the water depth) often resulted in an overlap of the "epilimnion" and "hypolimnion". The lack of a difference in phosphorus concentrations (epilimnion versus hypolimnion) in Otisco Lake was somewhat more surprising given the fairly strong thermal stratification observed in this lake. One possible explanation for this could be that our operational definition of hypolimnion (e.g., 2/3 the station depth) was above the area of phosphorus elevation. In fact, Effler, et al. found significant phosphorus elevation of soluble reactive phosphorus within the hypolimnion of Otisco Lake in earlier studies (Effler, et al., 1989a).

Figure 5.14: Conesus Lake epilimnetic and hypolimnetic total phosphorus levels



One significant uncertainty in the assessment of trophic conditions within the Finger Lakes relates to the recent introduction of Zebra mussels (Dreissena polymorpha) to the lakes (see Figure 5.15). The introduction of this non-native bivalve is thought to be causing significant changes in water chemistry within the Finger Lakes, including increasing water clarity, and decreasing levels of phosphorus and chlorophyll *a*. In other words, Zebra mussels can mimic the effects of nutrient reductions and the resultant decrease in algal productivity. For example, this could explain the apparent dissimilarity in trophic trends within Hemlock and Canadice Lakes. Both Hemlock and Canadice Lakes are relatively small Finger Lakes with fairly well protected watersheds, and each lake exhibits hypolimnetic hypoxia/anoxia during the late summer. However, trophic state trends in Canadice Lake and Hemlock Lake appear to be following differing tracks. Findings from Hemlock Lake suggest a substantial decline in trophic state as indicated by substantial increases in water clarity, and reductions in both total phosphorus and chlorophyll *a* levels between the early 1970s and the late 1990s. In contrast, trophic conditions in Canadice Lake have remained largely constant over the past several decades, as evidenced by nearly constant levels of chlorophyll a and total phosphorus, and consistent levels of water clarity. As it turns out, Canadice lake is the only Finger Lake in which Zebra mussels have not become established. As will be discussed more fully below (see discussion of calcium levels levels), it is conceivable that levels of calcium within Canadice Lake are inhibiting the establishment of Zebra mussels within the system. This would be consistent with the premise that Zebra mussels are exerting some influence on trophic indicators within the Finger Lakes.

Figure 5.15: Zebra mussel - *Dreissena polymorpha*

from: http://www.zeestop.com/adult_mussel.html

c. Major Ions

An ion is an atom, or molecule, that has gained or lost one or more electrons and acquired a net negative or positive charge. Positively charged ions are termed cations, while negatively charged ions are termed anions. The major ion species present in freshwater lakes (including the Finger Lakes) are as follows: (1) **cations**: calcium [Ca^{2+}], magnesium [Mg^{2+}], sodium [Na^{+}], and potassium [K^{+}]; and (2) **anions**: bicarbonate [HCO^{3-}], carbonate [CO_3^{2-}], sulfate [SO_4^{2-}], and chloride [Cl^{-}].

The ionic composition of a lake is of importance to both human use of the resource and ecosystem dynamics within the lake. High profile issues such as lake acidification, Zebra mussel infestation, and drinking water quality can all be influenced by the ionic composition of the lake.

In most freshwater aquatic systems the positive and negative charges associated with the various ionic species "approach" balance. However, analytical issues and the presence of un-quantified ions (e.g., organic ions) can result in minor differences in the calculated ion balance. For example, the average ratio of positive ions to negative ions for the USEPA 1991-95 Environmental Monitoring and Assessment Program (EMAP) data was 1.26 (USEPA, 1999a). A similar positive ion bias was apparent in most of the Finger Lakes during the 1990s.

Ion balances for each of the Finger Lakes during the later 1990s are presented in Figure 5.16. The ion balances presented here are intended to parallel those developed during the 1970s (Bloomfield, 1978), thus, for comparative purposes, they exclude some of the minor cation and anion species (e.g., ammonia and nitrate). Approximate comparisons between cation and anion totals from the 1970s and the 1990s are summarized in Table 5.9.

Figure 5.16: Finger Lakes cation/anion balance for the 1996-1999 period

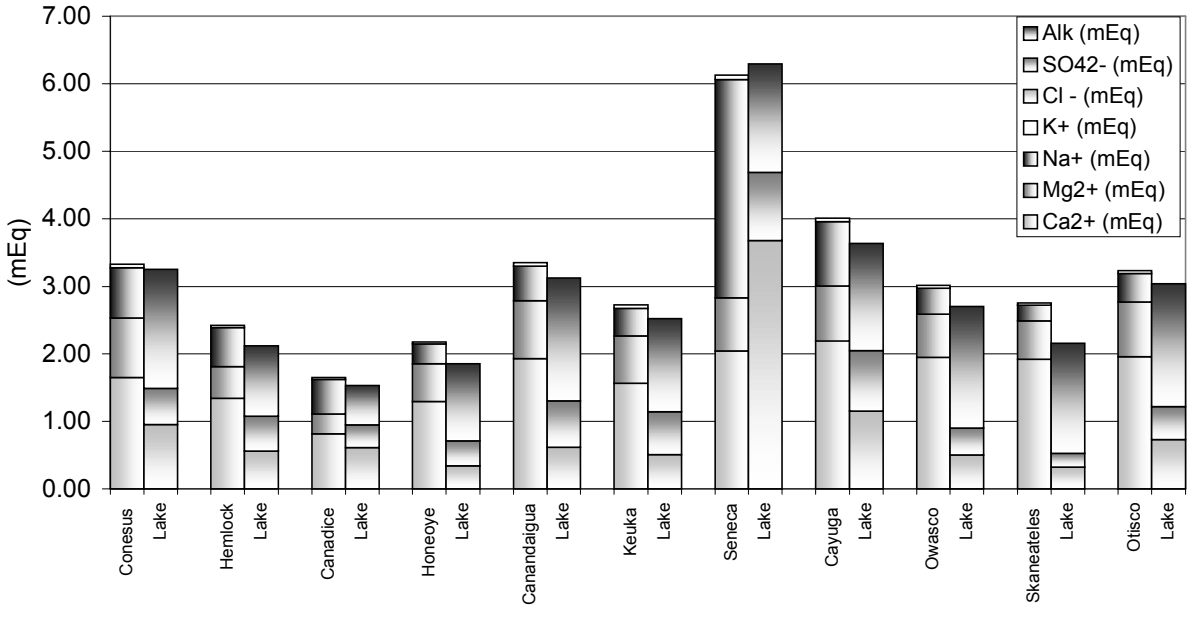


Figure 5.9: Temporal comparison of total cations and anions within the Finger Lakes

	Total Cations (mEq)		Total Anions (mEq)	
Lake	1970s	1990s	1970s	1990s
Conesus Lake	3.66	3.33	3.76	3.25
Hemlock Lake	2.18	2.42	2.23	2.12
Canadice Lake	1.44	1.65	1.40	1.53
Honeoye Lake	1.93	2.18	1.84	1.85
Canandaigua Lake	3.14	3.35	3.27	3.13
Keuka Lake	2.66	2.73	2.55	2.53
Seneca Lake	7.37	6.13	7.74	6.30
Cayuga Lake	5.24	4.01	5.03	3.64
Owasco Lake	3.13	3.01	2.98	2.70
Skaneateles Lake	2.73	2.75	2.71	2.16
Otisco Lake	3.61	3.23	3.38	3.04

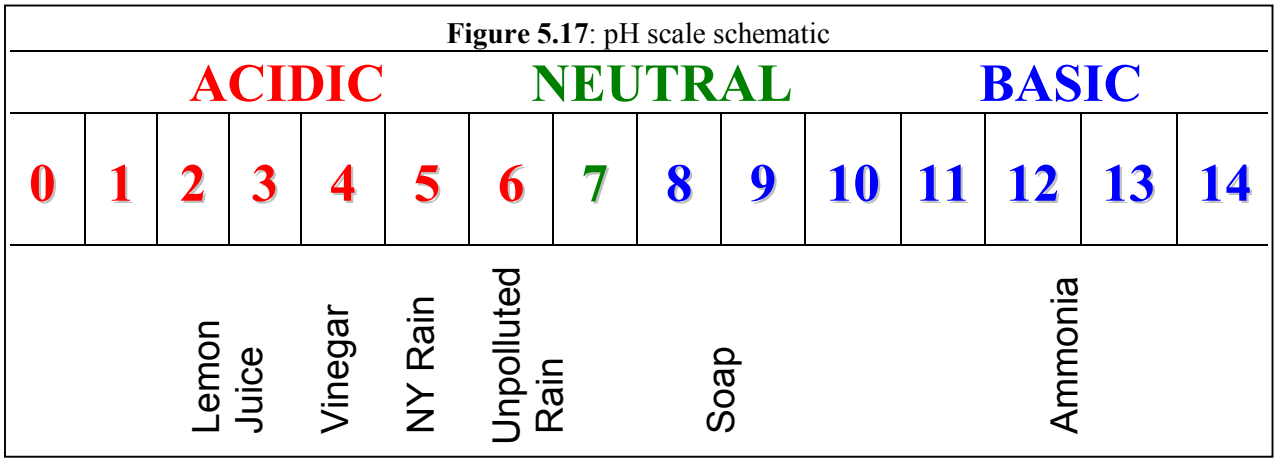
Spatial comparisons of cation and anion levels within the Finger Lakes during the 1990s indicate the following patterns. *First*, and most apparent, is that Seneca Lake and Cayuga Lake exhibit significantly higher cation and anion levels than do the other 9 lakes. This is due, primarily, to the relatively high sodium and chloride levels found in these deeper lakes. As discussed earlier, Seneca and Cayuga Lakes are significantly deeper than the other 9 Finger Lakes (see Figure 2.2). This contrast is even more apparent when one factors in the depths of post-glacial sediments beneath the lakes (Mullins, 1996). This disparity in depth of scour, has led to the hypothesis that the marked elevation in sodium and chloride levels within Seneca and Cayuga Lakes is the result of intersection of the lake basins with naturally occurring salt deposits underlying the region (Wing, et. al., 1995). However, the apparent decline in the concentrations of these ions within these two lakes over a relatively short period of time would seem somewhat at odds with this hypothesis. The *second* discernable pattern is that three of the four western-most Finger Lakes (Hemlock, Canadice and Honeoye Lakes) show significantly lower ion levels than do the other 8 Finger Lakes. This is most pronounced for Canadice Lake which shows the lowest total cation and anion levels of any of the lakes. The relatively low ion levels are likely a result of several factors, including: (1) Surface elevation: these three lakes are situated at higher surface elevations than the other lakes (Canadice Lake is situated at the highest surface elevation of all the Finger Lakes). These differences in surface elevations are likely reflected in underlying geology and resultant ionic composition of tributary runoff; and (2) Watershed Controls: Hemlock and Canadice Lakes are in fairly protected watersheds with minimal development which likely limits anthropogenic inputs. Similar spatial patterns in total ion levels were also apparent in the 1970s data-set.

Temporal comparisons of total cation and anion levels between the 1970s and the 1990s indicate some significant changes. The most pronounced changes, in absolute terms, involved changes in sodium and chloride levels within Seneca and Cayuga Lakes - see further discussion below. Changes, on a percentage basis, were as follows: (1) The largest decline in total cation levels occurred in Seneca and Cayuga Lakes, with more modest reductions observed in Conesus and Otisco Lakes – the specific cation responsible for the majority of the change varied. For Cayuga and Seneca Lakes, the cation responsible for the majority of the change was sodium, whereas, the principal cations responsible for changes in Conesus and Otisco Lakes were magnesium and calcium. In fact, sodium levels in both Conesus and Otisco Lakes appear to have increased substantially on a percentage basis; (2) The largest increase in total cation levels occurred in Canadice and Honeoye Lakes, with the majority of the increase due to increases in sodium levels – once again, see further discussion to follow; (3) The largest decrease in total anion levels occurred in Cayuga, Seneca, and Skaneateles Lakes. In the case of Cayuga and Seneca Lakes the principal anion responsible for the change is chloride, whereas, in Skaneateles Lake the majority of the change is attributable to a marked decline in sulfate levels; and (4) The largest increase in total anion levels occurred in Canadice Lake and is due primarily to increases in chloride levels.

Specific Conductivity and pH

Specific conductivity is a measure of the total ionic activity in water, while pH indicates the relative acidity (or hydrogen ion content) in the water column. pH is measured on a logarithmic scale from 1 to 14 (see Figure 5.17), with lower numbers indicating increasing acidity. Representative vertical profiles for both parameters during mid to late summer are presented in Figures 5.18-5.19.

Figure 5.17: pH scale schematic

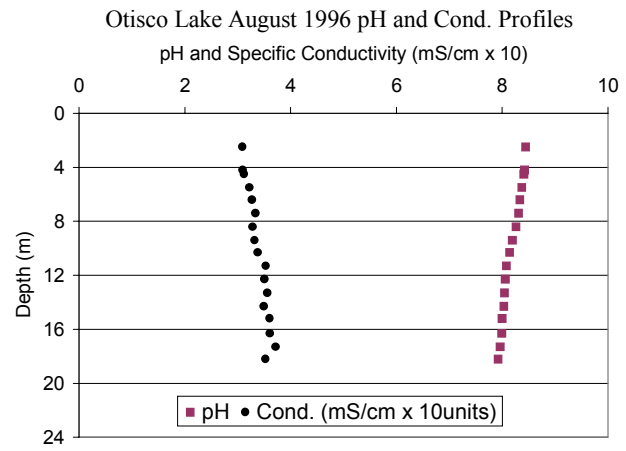


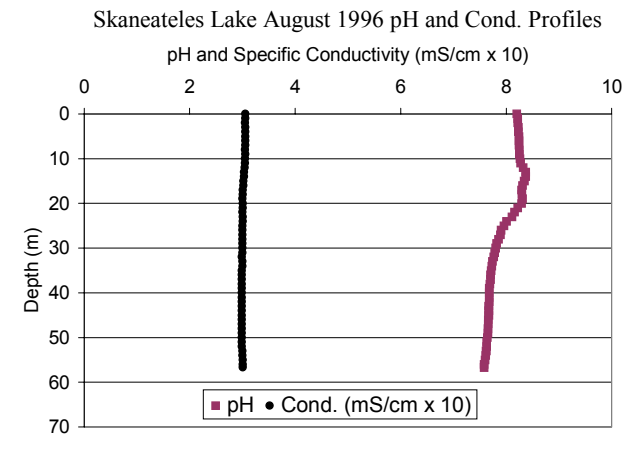
As one would expect given the link between specific conductivity and ionic concentration, Seneca Lake and Cayuga Lake (Figure 5.18) demonstrate higher specific conductivity levels than do the other 9 Finger Lakes. Similarly, Canadice Lake (Figure 5.18), which exhibits the lowest ionic levels, also shows the lowest specific conductivity levels of all the Finger lakes. The vertical profiles of specific conductivity indicate that each of the Finger Lakes show nearly uniform levels of specific conductance with depth. This was somewhat unexpected for Seneca and Cayuga Lakes given their relatively high conductivity levels and the suggestion that elevated ionic levels are the result of lake basin intersection with geologic salt deposits (Wing, 1995). It would seem that if the systems were being "fed" from salt deposits that this would result in a vertical gradient in conductivity levels. However, it is possible that such gradients are present in deeper waters – this investigation was limited by the length of the instrument cable (100 m) which precluded vertical measurements within the deepest portions of Seneca and Cayuga Lakes. It is also possible that mixing forces within the lakes dissipate any conductivity gradients.

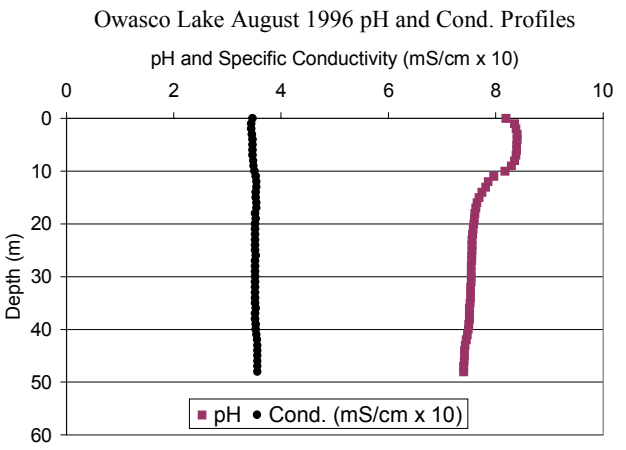
The most discernable pattern from pH profiles is the elevation in pH levels within upper waters of each lake. This pattern is quite common for stratified lake systems and is the result of the following factors: (1) algal uptake of CO_2 from epilimnetic waters with an equivalent consumption of hydrogen ions – thus increasing pH; and (2) decomposition of senescing algae within the hypolimnion resulting in the release of CO_2 and hydrogen ions. Significant pH swings occur within the Finger lakes during the growing season. The water quality standard for pH is 6.5-8.5. All of the lakes on occasion exceed a pH of 8.5, and several of the lakes occasionally exceed a pH of 9.0. In addition, pH drops below 6.5 in several of the lakes, with a few (e.g., Canadice Lake) dropping below 6.0. The significance of these excursions beyond the ambient water quality standard for pH is not known.

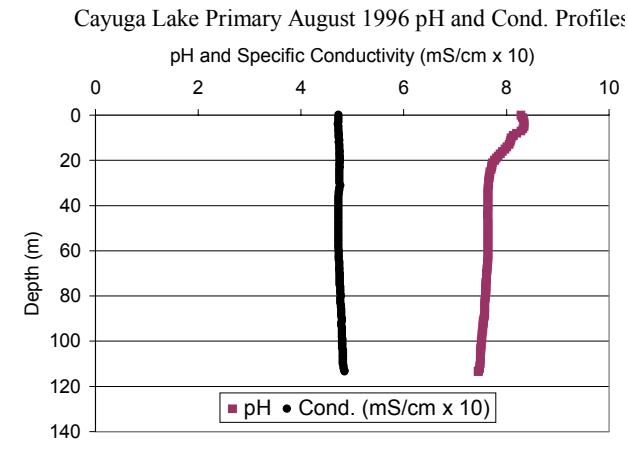
Findings for individual cations and anions will be presented below. The discussion of ionic trends is premised upon the current investigation and information from the late 1960s and early 1970s. The reader is cautioned to take the temporal comparisons with a grain of salt (pun intended) for the following reasons: (1) The earlier data is derived from a number of different sources, and sample frequency varied significantly; (2) The methods used to derive the levels of certain ions involved visual interpretation from graphs of milli-equivalent levels - obviously, this approach is open to some error; and (3) Specific sample locations for the 1970s data are unavailable, which introduces spatial differences into the comparison.

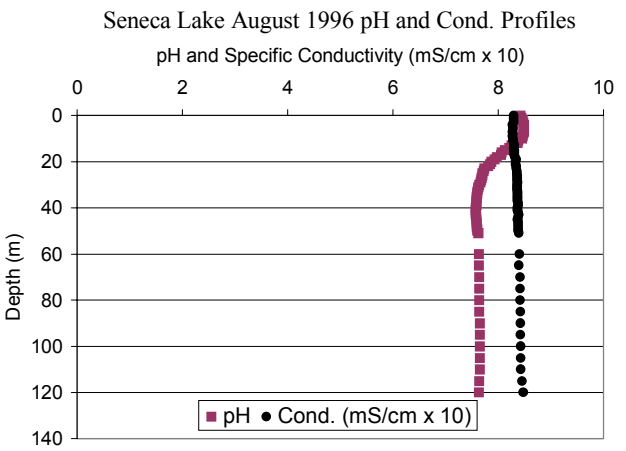
Figure 5.18: Specific Conductivity and pH in 6 eastern Finger Lakes











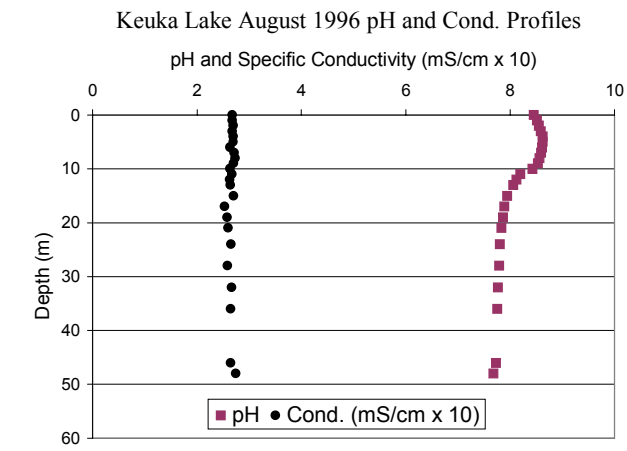
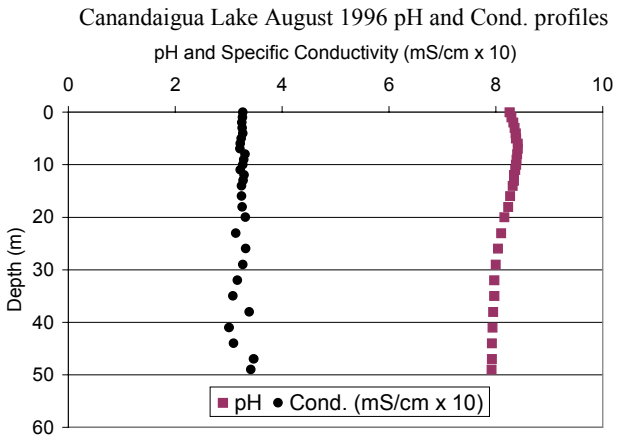
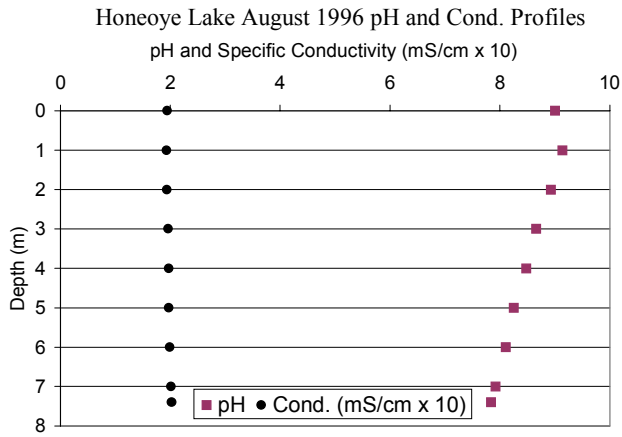
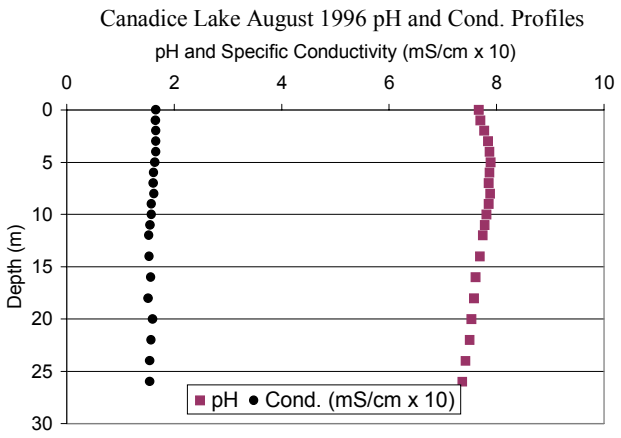
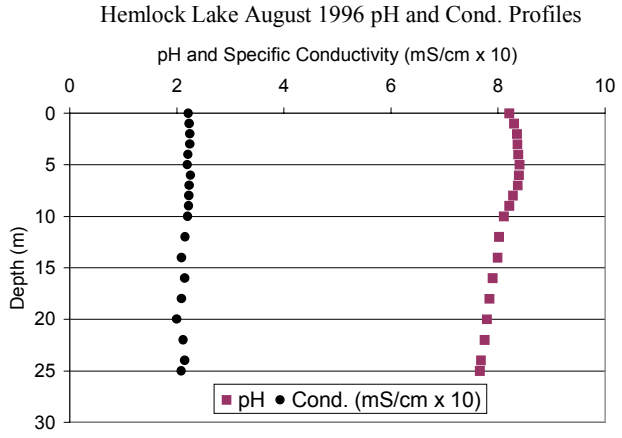


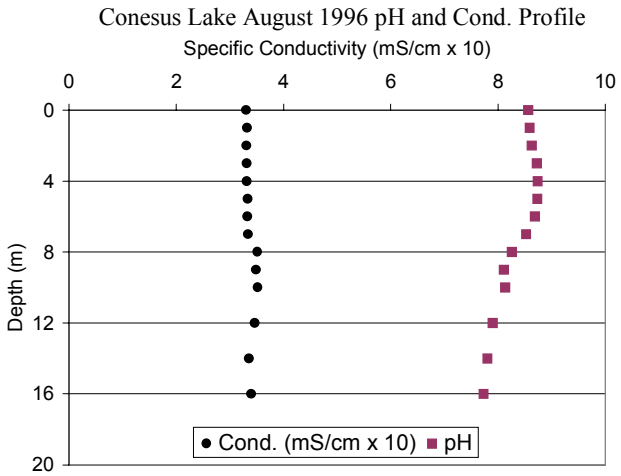
Figure 5.19: Specific Conductivity and pH in 5 western Finger Lakes











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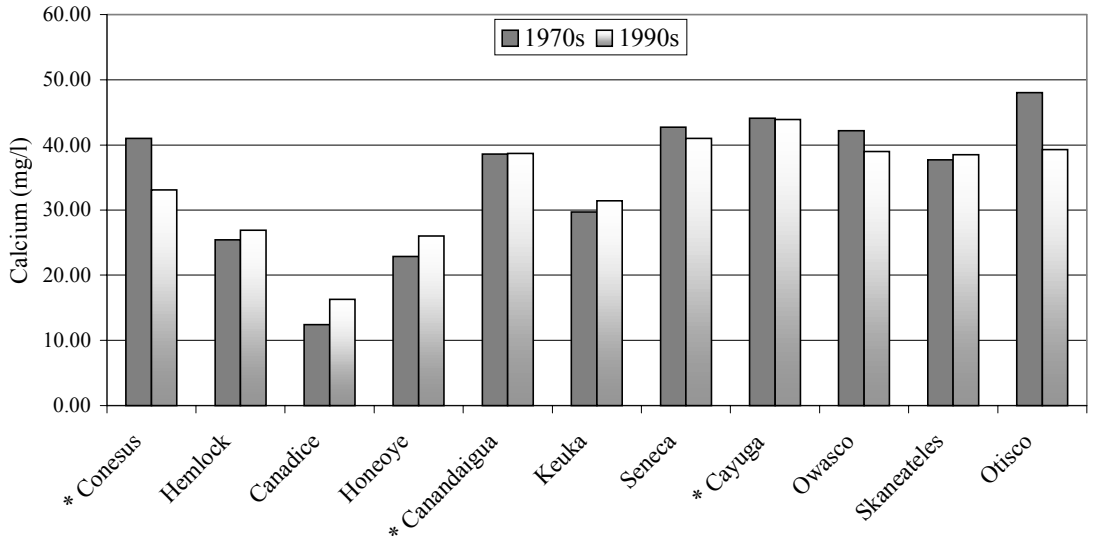
Calcium

Calcium is important to both the flora and fauna in fresh water aquatic systems, and is essential to the structure and functioning of cell membranes. Of particular concern to freshwater systems within the northeastern United States is the fact that calcium may play an important role in the establishment of Zebra mussel (Deissena polymorpha) populations within lake systems. The Zebra mussel is an exotic and invasive freshwater mussel which is native to the Black, Caspian, and Azov seas of southern Europe and Asia. Zebra mussels are capable of causing significant ecological changes within a lake by dramatically altering the food web structure. Furthermore, Zebra mussel infestations can result in significant economic impacts due to clogging of water supply intake pipes and other human structures. First introduced to the Great Lakes in the late 1980s, Zebra mussels have now been confirmed in all of the Finger lakes with the exception of Canadice Lake. The calcium concentration of a lake appears to be one of the primary limiting factors in Zebra mussel infestations (Ramcharan, et. al., 1992). It would appear that the calcium threshold for Zebra mussel development is in the range of 25-30 mg/l (Ramcharan, et al., 1992) – waters with calcium concentrations below this level do not appear to support the establishment of Zebra mussels while calcium concentrations above this level are conducive to the establishment of Zebra mussels. Furthermore, if calcium is a limiting factor to Zebra mussel proliferation within the Finger Lakes than it is possible that increasing calcium concentrations may exacerbate such infestations.

Epilimnetic calcium levels from the 1970s and the 1990s are presented in Figure 5.20. From a spatial perspective, 3 of the 4 western Finger Lakes exhibit significantly lower calcium levels than do the 7 eastern lakes. This is likely due to differences in geology and associated soil types within the lake watersheds – the result of differences in surface elevations. For example, Canadice Lake exhibits the lowest calcium levels and is located at the highest surface elevation of all the Finger Lakes – see Figure 2.4. Conesus Lake, the western-most Finger Lake, is the exception to this pattern.

From a temporal perspective, Conesus and Otisco Lakes show moderate declines in calcium levels over the past 2 decades. In contrast, Canadice and Honeoye Lakes show a moderate increase in calcium levels over the intervening time period. Owasco Lake exhibits a slight downward trend in calcium levels over the past couple of decades. Hemlock, Canandaigua, Keuka, Seneca, Cayuga, and Skaneateles Lakes have remained fairly static with respect to calcium levels.

Figure 5.20: Average epilimnetic calcium concentrations in the Finger Lakes



Consistent with the hypothesis of calcium acting as a limiting nutrient for Zebra mussels, Canadice Lake, which is the only one of the Finger Lakes in which Zebra mussel colonization is not yet established, also showed the lowest calcium levels of the 11 lakes. Canadice Lake is the only Finger Lake with an average calcium level below 20 mg/l. It is possible that Canadice Lake has avoided Zebra mussel infestation due to watershed protection measures in place within the basin, however, Hemlock Lake, which has similar restrictions, has not escaped establishment of Zebra mussel populations. A more likely scenario is that the relatively low calcium levels observed within Canadice Lake have prevented the establishment of a viable Zebra mussel population. On a cautionary note, the calcium levels observed within Canadice Lake appear to have increased by approximately 30 percent over the past several decades and might approach threshold levels for support of Zebra mussel populations within the near future.

Figure 5.21: Zebra mussels on macrophytes.

Concerns about calcium levels and Zebra mussel proliferation may not be limited to Canadice Lake. The issue of concern in the other Finger Lakes is not a matter of establishing a Zebra mussel population within the lakes, as they are already known to be present, but rather whether population levels will increase due to increased availability of calcium. While water column trends suggest a moderate increase in calcium levels in only a few of the lakes, sediment core data indicate a more significant increase in calcium levels within the bottom sediments of the lakes (see later discussion of sediment core findings). This raises the question "*whether, or not, these calcium deposits within the sediments can be 'mined' by the benthic dwelling Zebra mussels?"*. While Zebra mussel monitoring has not been a formal part of the present investigation, informal observations have indicated a marked increase in Zebra mussels in certain parts of the Finger Lakes over the last couple of years. For instance, between 1998-99 a significant increase in Zebra mussel populations was observed at the south end of Cayuga Lake. This proliferation in Zebra mussel numbers within the southern end of Cayuga Lake appeared to be in association with certain types of aquatic macrophytes (see Figure 5.21).

Another phenomenon associated with the occurrence of calcium in lake systems is what is termed calcite precipitation (or whiting events) and is often characterized by a milky or cloudy appearance to the water. Calcite precipitation is controlled by several factors including water temperature, pH, and calcium concentration, and is believed to be biologically mediated. Calcite ($CaCO_3$) precipitation events can lead to significant fluctuations in calcium levels within lake systems. Researchers at the Upstate Freshwater Institute have documented whiting events in several of the Finger lakes.

Magnesium

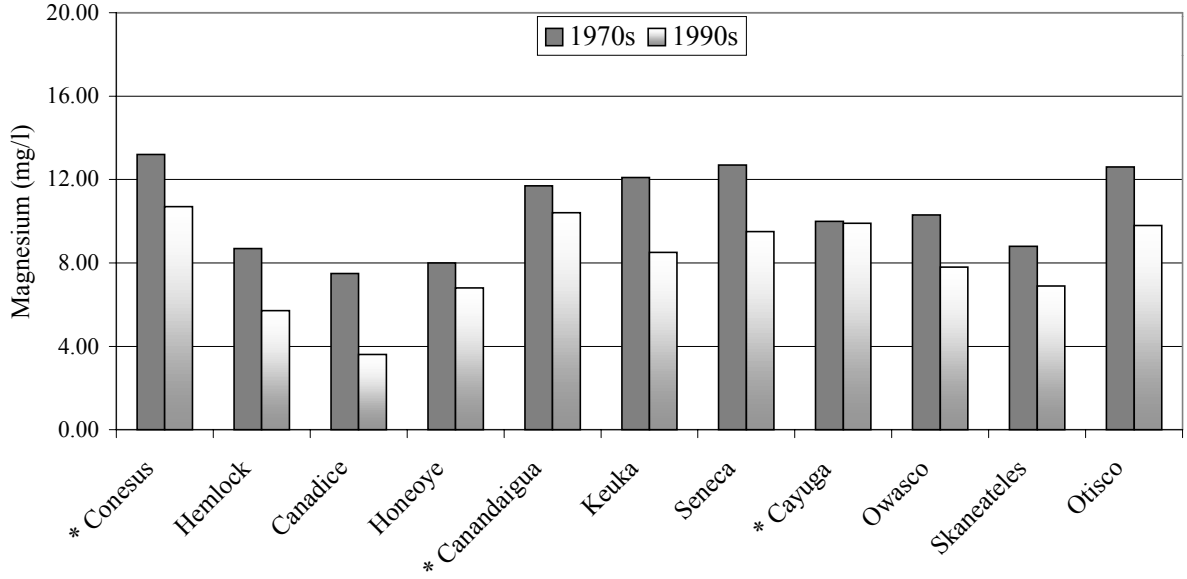
Magnesium is an important micronutrient in aquatic ecosystems. It is essential to the production of chlorophyll and is important in the functioning of certain enzymatic systems in algae, fungi, and bacteria.

Epilimnetic magnesium concentrations from the 1970s and the 1990s are shown in Figure 5.22. Spatial patterns for both periods are similar to those observed for calcium, in that magnesium levels are generally higher in the eastern lakes.

Temporal trends appear to indicate substantial declines in magnesium levels in each of the Finger Lakes, with the exception of Cayuga Lake, over the past several decades. The reduction is most pronounced (on a percentage basis) in the 3 western lakes. The magnitude of these apparent changes may indicate some anomaly in the data sets. It is conceivable that the analytical methods used during the two study periods were different. However, findings from Cayuga Lake suggest fairly static magnesium levels. Another issue may be the number of sample points available for several of these systems during the 1970s period. As indicated earlier, the number of data points available from the 1970s were quite limited for several of the lakes. For example, less than 5 data points were available for Otisco, Keuka, Seneca, Honeoye, and Canadice Lakes. However, a significant number of data points (> 10) were available for Conesus, Hemlock, Owasco and Skaneateles Lakes, each of which also showed marked declines in magnesium levels. It is also possible that 1973 (the year in which many of the earlier measurements were made) was somehow unusual, however, this would seem quite remarkable given the residence time of these waterbodies.

In summary, the magnesium findings would appear to warrant additional investigation. In particular, the analytical methods employed for the two study periods should be scrutinized. Should these apparent declines turn out to be real, the cause(s) and ecosystem consequences of such changes should be evaluated.

Figure 5.22: Mean epilimnetic magnesium concentrations in the Finger Lakes



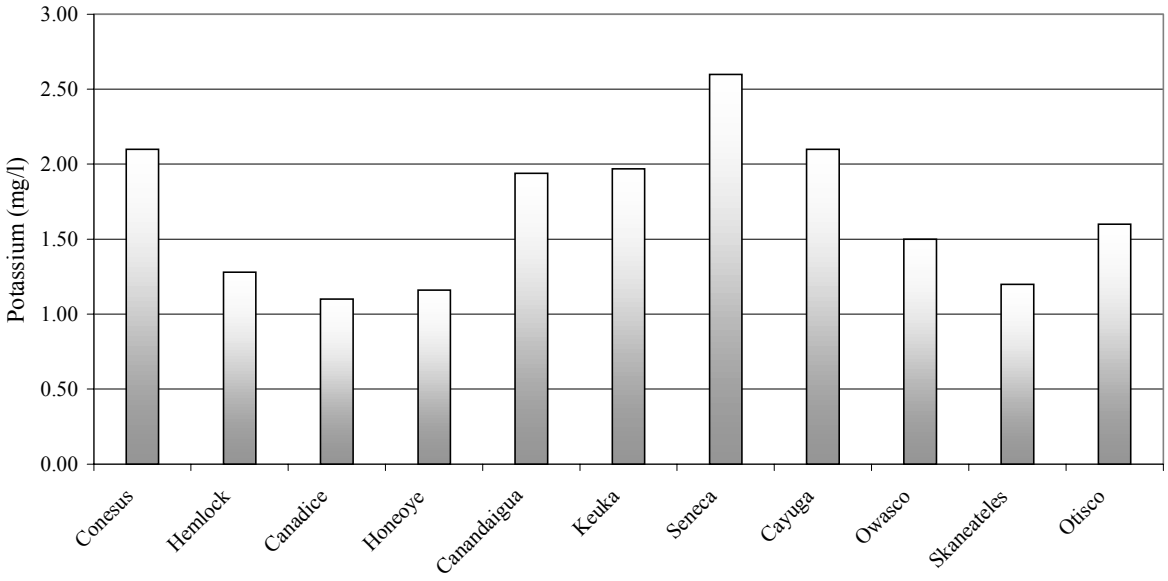
Potassium

Potassium is an essential nutrient for both plants and animals, and is involved in transport processes within living cells.

Potassium levels within the Finger Lakes vary by approximately two fold. Average epilimnetic potassium concentrations from the 1990s are shown in Figure 5.23 – potassium levels were not available from the 1970s. Potassium levels within the Finger Lakes range from a high of approximately 2.5 mg/l in Seneca Lake to a low of just over 1.0 mg/l in Canadice Lake. While the spatial patterns, once again, present something of an east-west trend, the differences are less pronounced than for some of the other ions discussed earlier. In this instance, the central lakes (and Conesus Lake) show the highest concentrations. The spatial patterns for potassium do not appear to parallel lake trophic status.

Temporal trends in potassium concentrations could not be evaluated given the lack of historical data. In addition, there are no applicable water quality standards for potassium.

Figure 5.23: Mean epilimnetic potassium concentrations in the Finger Lakes during the 1990s



Sodium

As with potassium, sodium is important in ion transport within living cells. However, elevated sodium intake has been implicated in hypertension and related heart problems in certain susceptible individuals. The New York State Department of Health has issued the following guidelines for drinking water (NYSDOH, 1998):

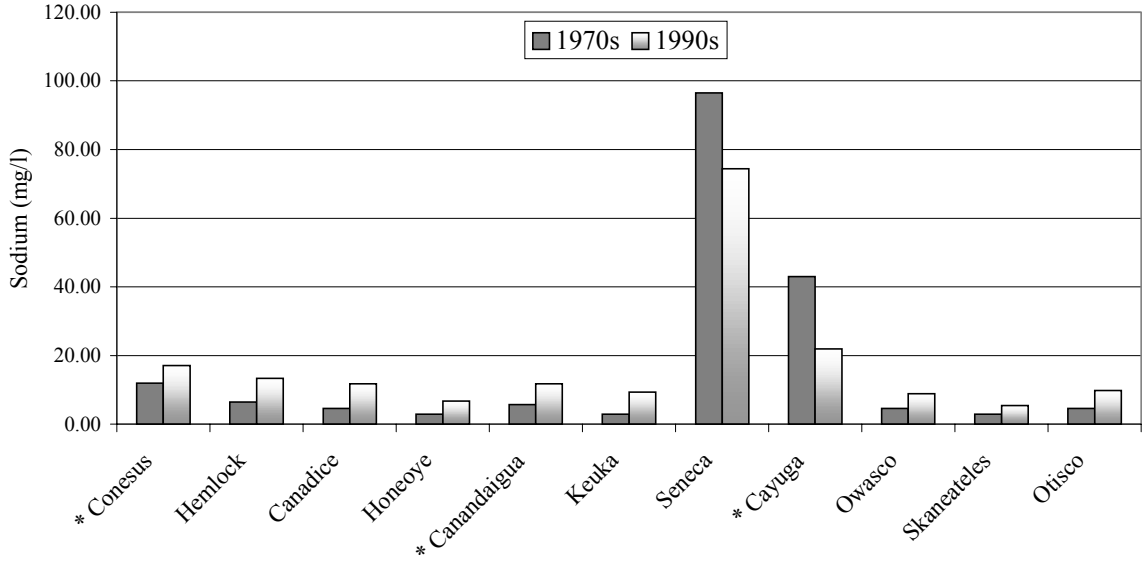
> "Water containing more than 20 mg/L of sodium should not be used for drinking by people on severely restricted sodium diets. Water containing more than 270 mg/L of sodium should not be used for drinking by people on moderately restricted sodium diets."

Other issues that can be of concern with respect to elevated sodium levels include: (1) increased corrosion in pipes; and (2) selective advantage to certain species of blue-green algae (Wetzel, 1983).

Mean epilimnetic sodium levels for the Finger Lakes are shown in Figure 5.24. Sodium levels presented for the 1970s are derived, largely, from a bar graph of milli-equivalents presented in Bloomfield (1978), as no compilation of sodium levels could be obtained elsewhere. Thus, the reader is cautioned that the 1970s values should be considered approximate. However, as one would expect, sodium patterns appear to parallel changes in chloride levels (see following discussion), the later of which are based on actual concentration measurements.

As has been known for some time, spatial patterns for sodium levels within the Finger Lakes indicate that the two larger lakes, Seneca Lake and Cayuga Lake, exhibit significantly higher levels (by nearly an order of magnitude) than do the other 9 lakes. The current findings continue to support this bifurcation, at least for Seneca Lake. Seneca Lake sodium levels continue to be at least 4 times higher than the other 9 Finger Lakes (excluding Cayuga Lake). In the case of Cayuga Lake, the most recent findings suggest that sodium levels are approaching the upper levels of the other 9 lakes. As discussed briefly above, the standing hypothesis for this divergence in sodium (and chloride) levels is that the deeper lakes intersect salt-laden strata which works its way into the water column (Wing, 1995). While this may account for some of the observed differences, there appear to be other factors at work – see discussion of temporal patterns below.

Figure 5.24: Mean epilimnetic sodium concentrations in the Finger Lakes.



Temporal changes in sodium levels within the Finger Lakes over the past several decades appear to follow one of two patterns. The two largest Finger Lakes, Seneca Lake and Cayuga Lake, exhibit a marked decline in sodium levels (in both absolute terms and on a percentage basis), while the other 9 lakes appear to show substantial increases in sodium levels (at least on a percentage basis) over the intervening period.

Sodium concentrations in Seneca Lake and Cayuga Lake have declined by approximately 20 percent and 50 percent, respectively, over the past 2 decades. This would seem to present something of a quandary for existing hypotheses regarding sodium variations within the Finger Lakes. The depth of scour hypothesis (Wing, et al., 1995) outlined earlier would seem a reasonable hypothesis to explain a static elevation in sodium levels within Seneca and Cayuga Lakes. However, such a hypothesis seems insufficient to explain the marked decline in sodium levels observed over the past several decades. The apparent dynamics in sodium levels over the relatively short time interval (from a geologic perspective) of the past several decades would suggest that some other factor(s), other than simply lake basin depth, is contributing to sodium levels within these two lake systems. A second, related factor, namely, the commercial mining of salt within the region might provide an explanation for the observed sodium changes in Seneca and Cayuga Lakes. It is conceivable that improvements in the operation of these mining facilities over the intervening period could be responsible for the observed changes.

In contrast to the 2 largest Finger Lakes, the remaining 9 lakes exhibited sizeable increases (on a percentage basis) in sodium levels over the same period. Increases in sodium levels for the other 9 lakes ranged from over 40 percent in Conesus Lake to over 200 percent in Keuka Lake. While the percentage change is quite high, absolute sodium levels remain relatively low. However, certain of the lakes (e.g., Conesus, Hemlock and Canadice Lakes) are approaching 20 mg/l - Department of Health criteria for people on severely restricted sodium diets. The reason(s) for the observed changes in sodium levels for these 9 lakes is not clear. One possible explanation for the observed increase in sodium levels within these lakes is increased use of deicing agents on roadways during the winter months. The combination of increased road building and, thus, increased demand for deicing agents, coupled with increased use of deicing agents per highway maintenance protocols, might account for the increases in observed sodium levels. Other possible explanations might include hydrologic variations (although these would have to be substantial given the retention times of these waterbodies), and/or changes in land use activities within these watersheds.

Chloride

Chloride is the anion most closely associated with the cation sodium. The coupling of these two ions produces the mineral sodium chloride which is better known as common table salt. The water quality standard for chloride is 250 mg/l.

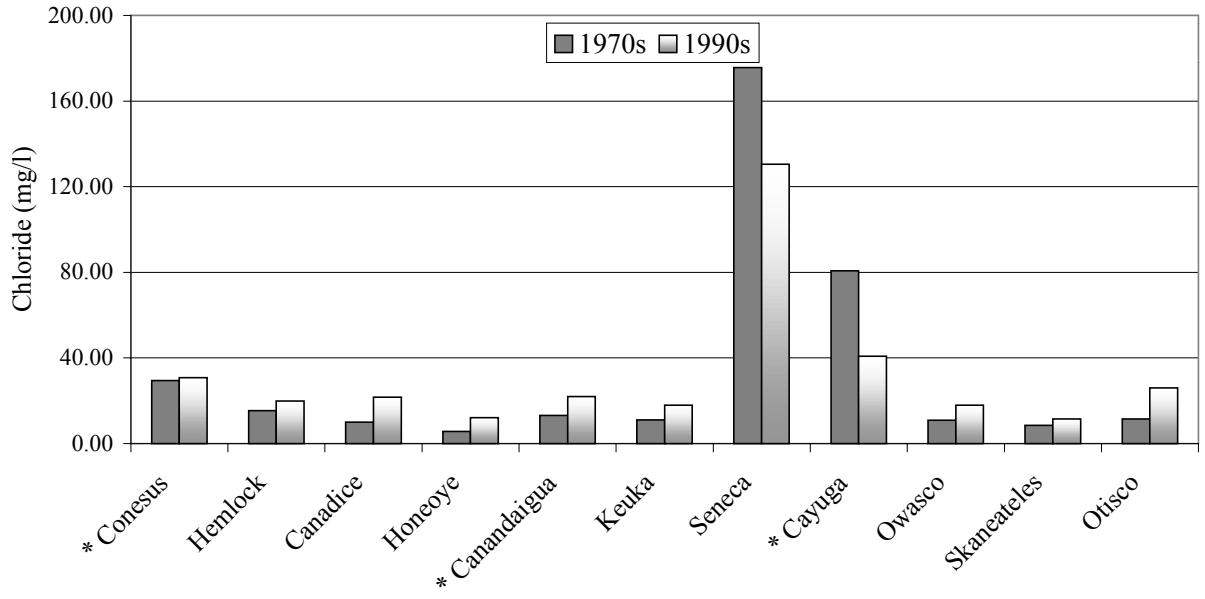
Mean epilimnetic chloride levels from the 1970s and the 1990s are presented in Figure 5.25. The 1970s values were obtained from either Mills (unpublished data, 1973) or Bloomfield (1978) .

As one might expect, given the close association between the anion chloride and the cation sodium, spatial patterns for chloride parallel those observed for sodium discussed above. Seneca Lake is clearly in a league of its own with respect to chloride levels. Chloride levels within Seneca Lake are more than 3 times greater than in any of the other Finger Lakes. Cayuga Lake also exhibits higher chloride levels than the other 9 Finger Lakes, however, the concentration differences have narrowed significantly over the past two decades.

Temporal patterns for chloride also parallel findings for sodium discussed above. For instance, the two largest Finger Lakes, Seneca Lake and Cayuga Lake, show significant declines in chloride concentrations - approximately 25 percent and 50 percent, respectively. The observed changes in chloride levels are probably of similar origins to those associated with changes in sodium concentrations (see previous discussion). Once again, this would appear to warrant some reevaluation of the hypotheses forwarded to account for chloride variations within the Finger Lakes. In contrast, the other 9 Finger Lakes show increases in chloride concentrations ranging from approximately 16 percent for Conesus Lake to 160 percent for Otisco Lake.

None of the Finger Lakes exceed the ambient water quality standard for chloride.

Figure 5.25: Mean epilimnetic chloride concentrations in the Finger Lakes.



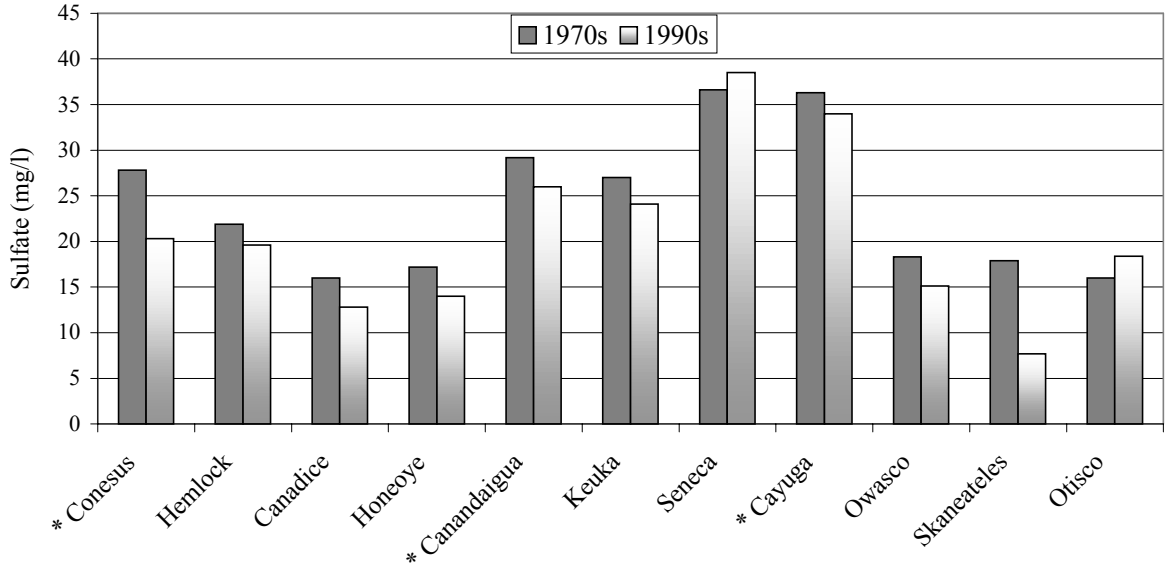
Sulfate

Sulfate (SO_4) is the predominant form of dissolved sulfur in most freshwater systems. Under conditions of low DO (reducing conditions) and low pH, sulfate can react to form hydrogen sulfide (H_2S) which imparts a "rotten egg" odor to a given water sample. We did not analyze for hydrogen sulfide, however, it is conceivable that the smaller eutrophic Finger Lakes may show some level of hydrogen sulfide during the mid to late summer months.

Mean epilimnetic sulfate levels within the Finger Lakes are presented in Figure 5.26. Spatial comparisons of sulfate levels indicate that Seneca Lake and Cayuga Lake exhibit the highest sulfate levels, and that Skaneateles Lake and Canadice Lake exhibit the lowest sulfate levels within the Finger Lakes. These findings are somewhat unexpected with respect to the conventional relationship between trophic state and/or DO levels, and sulfate production. Skaneateles Lake and Canadice Lake, which are on the less productive end of the productivity continuum, did show relatively low sulfate levels. However, Seneca Lake and Cayuga Lake exhibited higher sulfate levels than did Conesus and Otisco Lakes. This is inconsistent with the premise that increased productivity results is increasing sulfate levels. Findings also fail to show a correlation between DO levels and sulfate levels, in that epilimnetic and hypolimnetic sulfate levels within both Conesus Lake and Otisco Lake were largely the same.

Temporal findings appear to suggest that epilimnetic sulfate levels have increased slightly in Seneca Lake and Otisco Lake during the past several decades. In contrast, epilimnetic sulfate levels have declined significantly (20 percent or more) in Conesus Lake and Skaneateles Lake during the past several decades. Lesser declines are also apparent in many of the other Finger Lakes, including Hemlock, Canadice, Honeoye, Canandaigua, Keuka, Cayuga, and Owasco Lakes. The reason(s) for the observed changes in sulfate levels is not entirely clear. However, the downward trend in trophic conditions for many of the larger lakes is generally consistent with observed declines in sulfate levels.

Figure 5.26: Mean epilimnetic sulfate concentrations in the Finger Lakes.



Alkalinity

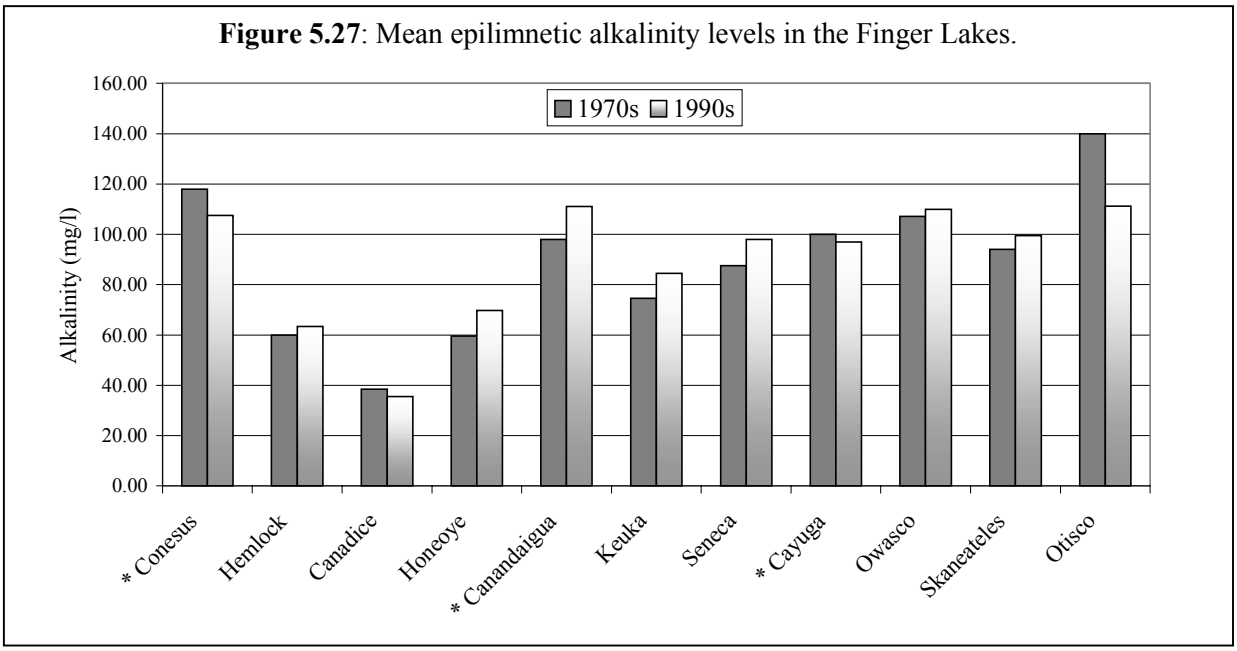
Alkalinity refers to the capacity of water to neutralize acid, and reflects the quantity of acid neutralizing constituents present within a water body. In most freshwater lakes in New York State, alkalinity is primarily a measure of bicarbonates (HCO_3^-) and carbonates (CO_3^{-2}).

The well publicized phenomenon of *lake acidification* is closely related to alkalinity. The principal determinants of whether a lake becomes acidified are: (1) the relative acidity of precipitation (e.g., rain) within the lake catchment – precipitation of pH < 5.6 is referred to as acid rain; and (2) the buffering, or neutralizing, capacity of the receiving water – largely controlled by the soils and underlying geology of the catchment. In general, alkalinity levels below 20 mg/l of $CaCO_3$ warrant concern.

Alkalinity levels for the Finger Lakes are presented in Figure 5.27. Alkalinity levels for the 1970s were obtained from Mills (unpublished, 1973) and Bloomfield (1978). Spatial patterns for alkalinity are similar to patterns observed for other ions in that Hemlock, Canadice, and Honeoye Lakes exhibit the lowest alkalinity levels. Alkalinity levels range from slightly greater than 100 mg/l for Conesus, Canandaigua and Otisco Lakes, to below 40 mg/l for Canadice Lake.

Temporal trends in alkalinity levels within the Finger Lakes vary somewhat. Conesus Lake and Otisco Lake show relatively large reductions in alkalinity levels over the past several decades. These changes may be the result of non-point source controls within these watersheds. The Otisco Lake watershed, in particular, has seen a significant investment in agricultural non-point control over the last decade, or so. Canadice Lake and Cayuga Lake show a smaller decline in alkalinity levels over the period, however, the numbers are clearly within the margin of error. In contrast, Honeoye, Canandaigua, Keuka, and Seneca Lakes show a moderate increase in alkalinity levels over the past couple of decades. Finally, Hemlock, Owasco, and Skaneateles Lakes show smaller increases in alkalinity levels, although, again, these are within the margin of error. In summary, all of the Finger Lakes, with the exception of Canadice Lake, exhibit alkalinity levels well above 20 mg/l. Thus, concerns about lake acidification and associated issues are not germane to most of the lakes. On the other hand, Canadice Lake probably warrants continued observation given its relatively low alkalinity levels and the slight downward trend.

Figure 5.27: Mean epilimnetic alkalinity levels in the Finger Lakes.



d. *Other Parameters* (nitrogen, silica, lead, arsenic, and pesticides)

Other parameters collected as part this investigation which did not logically fit under the previous topics include nitrogenous compounds, silica, the trace metals lead and arsenic, and current use pesticides.

Nitrogen, as any farmer or gardener is aware, is important for plant growth. However, as discussed above, primary productivity (algal growth) within the Finger Lakes is controlled largely by phosphorus availability (i.e., phosphorus-limiting systems). There are other issues which can be of concern with respect to certain nitrogenous species. This is reflected in ambient water quality standards (see Table 5.1) for both ammonia (NH_4) and nitrate/nitrite (NO_3/NO_2). Certain nitrogenous species can pose a threat to the health of both humans and aquatic biota.

There are two ambient water quality standards for total ammonia as follows: (a) human health standard related to drinking water supplies of 2 mg/l; and (b) aquatic toxicity standard, which is temperature and pH specific, ranging from 2.5 mg/l (at 0 °C and pH of 6.5) to 0.08 mg/l (Class "T" and "TS" waters at 30 °C and pH of 9.0). Total ammonia levels varied substantially within the Finger Lakes. While none of the lakes showed total ammonia levels above ambient water quality criteria, the relatively high pHs observed during the investigation and observed ammonia levels in certain of the lakes would seem to warrant continued observation. Three of the Finger Lakes (Conesus, Honeoye, and the southern shelf of Cayuga Lake), on occasion, exhibited total ammonia levels which could conceivably be of concern. Both Conesus Lake and Honeoye Lake exhibited several measurements of total ammonia above 0.1 mg/l. Conesus Lake showed a maximum total ammonia level of 0.21 mg/l and Honeoye Lake had a maximum total ammonia level of 0.17 mg/l. These measurements occurred at relatively low pHs and, thus, were below the ambient water quality standard. The southern Cayuga Lake site showed a total ammonia level of 0.46 mg/l on a single occasion. Once again, given the pH and the water temperature at the time, this would not constitute a violation of the ambient water quality standard. Furthermore, all other measurements of total ammonia at this site were less than 0.05 mg/l.

The ambient water quality standard for nitrate/nitrite is 10 mg/l and is designed to protect human health. In particular, this standard is intended to protect against a disease called methemoglobinemia (or blue baby syndrome) which can occur in infants under 6 months of age. The disease results from a reduction in the oxygen carrying capacity of the blood. Elevated nitrate/nitrite levels are most often a concern in ground waters underlying heavy agricultural areas. While quite infrequent, we did observe two instances when nitrate/nitrite levels approached or exceeded the 10 ug/l level. On June 6, 1996, a hypolimnetic (depth = 13 m) sample from Otisco Lake showed a nitrate/nitrite measurement of 9.6 mg/l. In addition, on August 5, 1996 a hypolimnetic (depth = 18 m) sample collected on Canadice Lake had a nitrate/nitrite concentration of 11.3 mg/l. The next highest nitrate/nitrite value observed on Canadice Lake during this investigation was 1.49 mg/l. In addition, discussions with Lenny Schantz of the Rochester Water Supply Bureau (personnel communication, 5-25-2000) indicated that this nitrate/nitrite value appeared unusually high.

Silica is a micronutrient which can be an important determinant of algal productivity in a lake. Specifically, silica is often the limiting nutrient for diatoms, an important group of freshwater algae. In many freshwater lakes the initial algal bloom of the season is composed of diatom species which require higher silica levels than do other algal species. Silica results during this investigation are consistent with the premise of algal uptake. In nearly all years and all lakes average silica levels were lower in the epilimnion than in the hypolimnion – in some instances there was a 10 fold difference between the upper waters and the lower waters. In addition, in many instances, the disparity in silica levels between the epilimnion and the hypolimnion often increased throughout the growing season – which is consistent with

"scavenging" of silica from the epilimnion and subsequent transfer to the hypolimnion upon algal senescence. There are no ambient water quality criteria for silica.

Water samples were also analyzed for lead during this investigation. Lead, which is a neurotoxin, has been a contaminant of concern within the environment for many years. However, the ban on leaded gasoline in 1970 has resulted in significant declines in lead levels within the environment – see sediment core discussion to follow below. Sampling results showed no water column lead concentrations above 15 ug/l (ambient water quality standard is 50 ug/l), and nearly all samples were below the analytical detection limit of 5 ug/l.

Sediment cores collected in 1998 indicated elevated arsenic levels within the upper sediments of several of the Finger Lakes – see further discussion below. This prompted water column sampling for arsenic during 1999. Arsenic, which is a known carcinogen, can originate from both natural and anthropogenic sources. The USEPA is currently reevaluating the maximum contaminant level (MCL) for arsenic and is expected to lower the allowable level significantly. As with other parameters, water samples were collected from both the epilimnion and the hypolimnion. All results, with the exception of a single sample, were below analytical detection levels. The one sample in which arsenic was detected came from Owasco Lake in September 1999. While the overall results are encouraging, they are not conclusive for the following reasons: (a) spatial limitations – monitoring was limited to a single location within each lake and to only two discrete depths per lake, (b) temporal limitations – sampling was limited to the 1999 season, (c) analytical detection limits were 10 ug/l, which is at or above the proposed MCL.

The United States Geological Survey (USGS) in conjunction with the NYSDEC, conducted sampling for current use pesticides on the Finger Lakes during the late 1990s. While not officially part of the current investigation, summary results from the pesticide monitoring were deemed appropriate for inclusion within this report. Results of this effort are summarized in Table 5.10 (from USGS, 2000).

Table 5.10: Results of USGS pesticide monitoring on the Finger Lakes (USGS, in press)

Lake	Sample #	Pesticides Detected (#)	Max. Atrazine (ug/l)	Max. Metolachlor (ug/l)
Conesus	2	8	.273	.128
Hemlock	17	6	.040	.048
Canadice	7	5	.017	.011
Honeoye	2	4	.017	.005
Canandaigua	2	7	.149	.025
Keuka	2	6	.036	.007
Seneca	14	7	.143	.017
Cayuga	31	8	.314	.128
Owasco	2	6	.148	.101
Skaneateles	11	6	.086	.048
Otisco	2	5	.114	.123

Findings from the pesticide investigation indicate that pesticide levels within the Finger Lakes vary significantly between the lakes. Cayuga Lake and Conesus Lake exhibited the highest levels of atrazine and metolachlor. The in-lake concentrations observed are all below the current MCL for these compounds. However, the levels of pesticides observed in several of the lakes warrant additional investigation in the future.

Chapter 6: Recommendations

The Synoptic Water Quality Investigation provides important information regarding current limnological conditions and limnological trends within the Finger Lakes. Findings from this investigation indicate substantial changes over the past several decades. However, important questions remain unanswered, and additional study is warranted as follows.

First, given the importance of these lakes to the Finger Lakes Region and New York State as a whole, and observed changes to date, it is recommended that the Long-term Synoptic Investigation continue for several more years. Continued study of the Finger Lakes should prove valuable in several regards, including: (a) evaluating the influence of anthropogenic activities within the Finger Lakes Region, (b) assessing the influence of exotic flora and fauna within the lakes (e.g., zebra mussels, spiny water flea, milfoil, etc.), (c) providing a sound statistical basis upon which to assess water quality trends within the Finger Lakes – natural inter-annual fluctuations necessitate long-term data sets, (d) assessing resultant water quality benefits derived from environmental management initiatives such as the 1996 Environmental Bond Act expenditures, lake/watershed management plans, best management practices, etc. and (e) providing valuable information in development of nutrient criteria for the state and/or ecoregion. Finally, as indicated by Birge and Juday nearly a century ago, this series of lakes provide an ideal laboratory for understanding limnological concepts.

Second, it is recommended that the Long-term Synoptic Investigation be expanded to encompass biotic indices for the Finger Lakes. By-in-large this investigation has focused upon chemical and/or physical parameters, with only a cursory look (e.g., chlorophyll *a*) at the biological components of the lakes. While there has been a parallel study ongoing within the western 7 Finger Lakes by the agency's Region 8 Fisheries unit which has involved additional biotic indices (e.g., zooplankton), it would clearly be beneficial to expand biotic monitoring to all 11 of the Finger Lakes and to add additional biotic indices. Additional biotic indices of interest include: (a) P*hytoplankton* – which represents the top of the food web for freshwater systems, and can provide valuable insight regarding the stability of the aquatic food web; (b) M*acrophytes* – several of the Finger Lakes are adversely effected by excessive growth of certain aquatic plant species which can interfere with certain uses of the lakes. Thus, a sound understanding of macrophyte coverage and dynamics within the lakes would be a valuable addition to the water quality investigation of these lakes; (c) *Bacteriological* – the Finger Lakes are used extensively as a source of drinking water and for primary contact recreation (e.g., swimming). Thus, it would be prudent to include systematic study of bacteriological and pathogen levels within the lakes. This should focus upon near shore areas and areas proximate to public water supplies and/or public beaches; (d) *Zebra mussels* – as discussed above, Zebra mussel infestation within the Finger Lakes may result in significant changes in both chemical cycling and ecosystem dynamics within the Finger Lakes. Therefore, it is suggested that a monitoring program be initiated within the Finger Lakes to track Zebra mussel infestation within the lakes. This should involve monitoring of both veligers and adult populations, and should parallel study of limnological conditions within the lakes; and (e) Other exotic flora and fauna – a number of other exotic species have become established within the Finger Lakes which should be monitored on a periodic basis.

Third, the apparent dichotomy in trophic response to nutrient load reductions between large and small lakes should be investigated more fully. It is recommended that efforts be made to assess nutrient loading reductions within the Finger Lakes watersheds (or a subset thereof) during the last several decades, and to assess whether those reductions have resulted in concomitant improvements in lake water quality. In addition, an assessment should be made of internal phosphorus dynamics within several of the smaller Finger Lakes, in an effort to understand the interplay between hypolimnetic dissolved oxygen levels and the release of phosphorus from benthic sediments.

Fourth, given that Conesus Lake, Honeoye Lake, and, on occasion, the southern end of Cayuga Lake exceed the New York State total phosphorus guidance value of 20 ug/l, efforts should be made to reduce phosphorus loading to these waters. Where best usage of the waters is impaired or precluded, a Total Maximum Daily Load (TMDL) should be developed to redress the water quality impairment condition(s).

Fifth, given the extensive use of the Finger Lakes for water supply, it would seem warranted to assess trihalomethane (THM) formation potential within these important water sources. THMs are a class of chlorinated organic contaminants which are under increasing scrutiny by public health agencies due to their potential cancinogenic properties and other possible health effects. THM production is a byproduct of the chlorine disinfection process. The production of THMs is also influenced by other factors such as the level of organic material present in the source water. Thus, cultural eutrophication can exacerbate THM related concerns.

Sixth, dissolved oxygen levels within several of the smaller Finger Lakes currently fall below existing water quality standards. Observed excursions include both hypoxia (DO < 4.0 mg/l) and anoxia (DO < 1.0 mg/l), and are limited to hypolimnetic waters. The cause(s) and possible impacts of these dissolved oxygen depletions should be investigated – see related recommendation #3 above. With respect to causality, efforts should be made to determine if observed dissolved oxygen depletions are primarily the result of natural conditions (e.g., lake morphometry) or are anthropogenically mediated (e.g., cultural eutrophication). Possible impacts of dissolved oxygen depletions should also be evaluated. These should include both ecosystem and human health related concerns relating to chemical availability.

Seventh, the causes and possible ramifications of increasing calcium levels should be assessed. In particular, Zebra mussel population dynamics should be evaluated in the context of existing food web structure and resource impairments (e.g., clogging of intake pipes, etc.).

Eighth, while continued study of the Finger Lakes is clearly warranted, it is critical that monitoring activities include sampling of tributary waters as well. Tributary monitoring efforts are, in fact, underway in several Finger Lakes watersheds (e.g., Canandaigua Lake, Keuka Lake, Seneca Lake, etc.). However, a coordinated approach to assessing event-based/nonpoint source loading within the Finger Lakes would be extremely valuable. It is suggested that the tributary sampling program be composed of two distinct components, as follows: (a) *Geographically Specific*: there are several locations within the Finger Lakes which should be specifically targeted for event-based tributary monitoring to support development of waste assimilative capacity estimates. These include Conesus and Honeoye Lakes, as well as the southern end of Cayuga Lake; and (b) *Reference Conditions*: a second component would involve the development of a tributary monitoring program designed to characterize generalized runoff coefficients within the Finger Lakes Region. These estimates could be used to calibrate basic water quality screening models which would be of value in watershed management activities. These local and regional efforts could best be carried out as collaborative efforts between local, state, and federal entities and with the possible involvement of academic and other institutions within the given locations.

Part B: Sediment Core Investigation

Chapter 7: Purpose

The purpose of the *Sediment Core Investigation* is to systematically assess chemical patterns within the Finger Lakes over time. Specific goals of the Study are as follows:

1. Assess spatial variations in chemical patterns between the Finger Lakes,

2. Assess temporal patterns of chemical inputs within each lake,

3. Evaluate chemical levels with respect to sediment quality assessment values,

4. Determine sediment accumulation rates.

A second, related study, termed the *Synoptic Water Quality Investigation*, involves long term synoptic water quality monitoring on each of the lakes and is discussed above (see Part A)
.

Chapter 8: Design and Methods

The Finger Lakes Sediment Core Investigation involved the collection of a deep water sediment core from each of the 11 Finger Lakes, vertical segmentation of the core, radiometric dating of core segments, and chemical (organic and inorganic) analysis of core segments. The Sediment Core Investigation was designed as a one-time effort and was conducted between 1997-98.

Sample Collection

All sediment cores, with the exception of the Seneca Lake core, were collected from the New York State Department of Environmental Conservation (NYSDEC), Division of Water (DOW) sediment assessment vessel (Figure 8.1). The vessel, a 23 feet long aluminum pontoon boat, is equipped with a 19 feet tall tripod and electric winch. The deck of the vessel has a 4 x 3 foot opening to allow deployment of the sediment coring device.

Figure 8.1: NYSDEC sediment assessment pontoon boat

The Seneca Lake core was collected in cooperation with Professor John Halfman of Hobart and William Smith College (Geneva, NY) using their research vessel, which is stationed on Seneca Lake.

Sediment cores were collected with a modified Wildco Box Corer [model # 191-A15; dimensions 15.2 x 15.2 x 100 cm] – see Figure 8.2, and associated acrylic core liner. Factory modification involved lengthening the corer to accommodate collection of 1-meter cores. The corner seams of the liner(s) proved of insufficient strength (often splitting upon removal and/or core extrusion) and had to be reinforced with duct tape. Otherwise, the box corer worked well.

Figure 8.2: Wildco Box Corer

The core collection procedure is as follows: (a) the box corer is lowered to within approximately 2 meters of the lake bottom using an electric winch; (b) sufficient winch cable is spooled out to allow free-fall of the corer to the lake bottom; (c) the sample crew secures the spooled cable, and when in position they release the cable in unison; (d) immediately after core penetration, tension is reestablished on the cable to establish vertical stability of the corer; (e) the corer is retrieved using an electronic winch; (f) once on board the sampling vessel, the box corer is placed within a wash basin and the corer is lifted off the core liner; (g) water overlying the core is siphoned off to minimize disturbance of the upper core layers during transport to shore; (h) core length is measured; and (i) core is secured for transport to shore.

The core extrusion and segmentation procedure is as follows: (a) core liner is hoisted atop an extrusion apparatus (this consists of a wooden frame with an extruding surface area slightly smaller than the surface area of the core liner); (b) meter stick is affixed to the side of the liner to enable measurement of individual sediment segments; (c) sediment core is pushed upward by prescribed increment; (d) core segment is inspected and visually described; (e) core segment is sliced off and sub-sectioned for laboratory submission; and (f) steps c through e are repeated as necessary. Sediment cores are sectioned into 1–4 cm increments and analyzed for the following parameters: (1) radioisotopes, (2) organic compounds, (3) inorganic compounds, and (4) ancillary parameters.

All sediment cores were collected from deep water locations – either maximum lake depth or greater than 25 meters. Deep water locations are more likely to contain undisturbed sediment deposits than are shallower areas. Thus, in theory, deep water cores insure an intact sediment chronology – as will be discussed below, this proved only partially true. Sample locations and approximate water depths for each of the sediment cores are shown in Table 8.1.

Table 8.1: Sediment core sample locations

Lake	**Latitude**	**Longitude**	**Water Depth (m)**	**Landmarks (**latitudinal**)**
Otisco	42 51 24	76 16 37	20	South of Bay Shores
Skaneateles	42 53 33	76 24 08	35	Thornton Grove
Owasco	42 51 48	76 31 21	35	Burtis Point
Cayuga	42 32 50	76 34 01	65	Between Myers & Taughannock Points
Seneca	42 43 07	76 56 14	130	Sampson State Park
Keuka	42 25 58	77 11 00	45	Silvernail Road
Canandaigua	42 41 50	77 21 11	60	Just south of Long Point
Honeoye	42 45 05	77 30 42	8	California Point
Canadice	42 43 01	77 34 01	27	Mid-point of lake
Hemlock	42 42 26	77 35 37	27	3.8 km from south end of lake
Conesus	42 45 00	77 43 05	16	Cotton Wood Point

Analyses

Radioisotopes

Selected core segments were analyzed for radioisotopes (including ^{137}Cs, ^{210}Pb, ^{214}Bi, and ^{226}Ra) in an effort to establish time chronologies within the given core.

Samples were dried in a hood under a heat lamp and ground in a mortar with a pestle. Sub-samples were transferred to plastic vials and sealed for at least twenty days to allow the short-lived daughters of ^{226}Ra to grow into equilibrium. The sub-samples were analyzed for ^{137}Cs, total ^{210}Pb ($^{210}Pb_{tot}$), ^{214}Pb, and ^{214}Bi via gamma counting. ^{214}Pb and ^{214}Bi are short-lived daughters of ^{226}Ra (which is also the parent of ^{210}Pb). The mean equilibrium activity of ^{214}Pb and ^{214}Bi is equal to the supported ^{210}Pb ($^{210}Pb_{sup}$), the portion of $^{210}Pb_{tot}$ "supported" by the decay of ^{226}Ra in the sediments. Subtraction of $^{210}Pb_{sup}$ from $^{210}Pb_{tot}$ yields excess ^{210}Pb ($^{210}Pb_{xs}$) which was derived from the atmosphere and decays away in the sediments with a half life of 22 years. ^{137}Cs activities are reported in units of picocuries per kilogram (pCi/kg) while ^{210}Pb activities are given in decays per minute per gram (dpm/g). Dividing dpm/g by .00222 yields pCi/kg.

Radionuclide measurements were carried out using a gamma counter with an intrinsic germanium detector. Blank corrections were applied to each sample based on the analysis of empty sample containers. Background corrections were applied to each radionuclide based on the sample count rate at energies just above and just below each peak of interest. For ^{137}Cs, detector efficiency was calibrated using an NBS sediment standard (River sediment NBS 4350B), a liquid NBS standard (NBS 4953-C) that was used to prepare spiked sediments (G-standards), and secondary standards (D-standards) prepared at the Lamont-Doherty Earth Observatory and calibrated to NBS standards.

No major problems were encountered with the gamma counter: it remained stable during the entire period of counting.

Organic Chemicals

The suit of organic analytes measured during this study is shown in Table 8.2. These substances are termed organochlorines due to their composition (carbon and chloride molecules). All of these substances are currently either banned or restricted for usage within the United States. Thus, occurrence of these substances in the environment is likely the result of historical use and/or improper disposal. Unfortunately, from an environmental perspective, many of these substances are quite stable in aquatic environments and susceptible to biotic uptake and bioaccumulation. Thus, a number of these substances can remain in the environment for long periods of time and can increase in concentration within biota.

The analytical method used for organic analyses was EPA method 608/8080 [Organochloride Pesticides/PCB's (Dual column GC/ECD)]. Sediment samples were homogenized and a 5-10 gram aliquot was used for analysis. The aliquots were Soxhlet extracted for 16 hours using acetone/hexane (1:1). After extraction, the extracts were treated with anhydrous sodium sulfate and given further cleanup with gel permeation chromatography and Florisil. The analyses were performed using a 5890 Hewlett Packard gas chromatograph with a 60 meter DB-5 capillary column (J&W scientific), I.D. - 0.25 mm with a film thickness of 0.1 micron, using a Nickel 63 electron capture detector. The carrier gas was helium (0.8 mL/min) with nitrogen as the auxiliary gas (60 mL/min). The initial temperature of 90 degrees C was held for one minute, programmed to 150 degrees C at 25 degrees C per minute and held for 4 minutes, then programmed to 290 degrees C at 1.5 degrees C per minute. The final temperature was held for 40 minutes. Samples were also analyzed for total organic carbon using the Walkley-Black titration procedure.

Table 8.2: Organic analytes and usage (mostly historical).

Analyte	Description
HCH, alpha	Breakdown product of HCH, gamma
HCH, gamma	Hexachloro Cyclo Hexane; Insecticide - common name is lindane.
HCH, Beta	Breakdown product of HCH, gamma
HCH, Delta	Breakdown product of HCH, gamma
Heptachlor	Insecticide, restricted to underground termite control.
Heptachlor Epoxide	Formed by chemical and biological transformation of heptachlor.
Endosulfan I	Insecticide
Endosulfan II	Insecticide
Endosulfan Sulfate	Breakdown product of endosulfan
Aldrin	Insecticide
Dieldrin	Insecticide
Endrin	Insecticide
Endrin Aldehyde	Metabolite of endrin.
* 4,4'-DDT	Dichloro Diphenyl Trichloro Ethane; Insecticide
* 4,4'-DDE	Dichloro Diphenyl Dichloro Ethylene; breakdown product of DDT.
* 4,4'-DDD	Dichloro Diphenyl Dichloro Ethane; Insecticide
Methoxychlor	Insecticide
Toxaphene	Insecticide
Chlordane	Insecticide
Mirex	Insecticide and fire retardant.
* Total PCBs	
PCB Aroclor 1221	Hydraulics, plasticizers, adhesives, and electrical capacitors.
PCB Aroclor 1016/1242	Electrical capacitors and transformers, vacuum pumps, and gas-transmission turbines, heat transfer fluid, hydraulic fluids, rubber plasticizer, carbonless paper, adhesives and wax extenders.
PCB Aroclor 1248	Hydraulic fluids, vacuum pumps, plasticizers, synthetic resins, & adhesives.
PCB Aroclor 1254	Hydraulic fluid, rubber plasticizers, synthetic resins, adhesives, wax extenders, de-dusting agents, inks, cutting oils, pesticide extenders, sealants and caulking compounds.
PCB Aroclor 1260	Electrical transformers, hydraulic fluids, plasticizer, synthetic resins and de-dusting agents.

* Findings are presented below for these compounds

Inorganic Chemicals

Inorganic analytes are shown in Table 8.3. Analytical methods for inorganic analysis are: (1) SW-846 ICP method 6010 for total metals; (2) method 7740 for selenium; and (3) method 7470 for mercury.

The sediments are initially digested using SW-846 method 3050B. A representative aliquot of sample is weighed into a beaker and digested using nitric acid and hydrogen peroxide on a standard hot plate. Hydrochloric acid is used as a final reflux acid for ICP analyses. Nitric Acid is used as the final reflux acid for Graphite Furnace analyses. The samples are then analyzed by ICP-AES or Graphite Furnace Atomic Absorption (GFAA). The metals are analyzed on a Perkin Elmer Optima 3000XL Axial ICP using the internal standard, Yttrium, to help stabilize the "plasma environment". This axial ICP allows for much lower detection limits than the standard radial ICP, but the Linear Range is sacrificed to obtain lower level detection limits. Metals that do not need low detection limits and are known to have high concentrations, such as the Alkaline Earth metals (Ca, K, Na, and K) are analyzed on a Leeman PS3000 radial ICP. Any low level metals such as As, Se, Pb and Tl that do not fall within SW-846 6010B criteria, can also be analyzed by GFAA - performed on a Perkin Elmer 4100ZL. This furnace has a Zeeman Background Correction that is used to help overcome difficult matrix interference. The sediments are also digested and analyzed for Mercury using Cold Vapor Atomic Absorption (CVAA) using method 7471. A Perkin Elmer FIMS analyzer was used to determine Hg concentrations in the sediment samples.

Table 8.3: Inorganic analytes and potential sources

Analyte	Symbol	Comments and Possible Sources
Aluminum	Al	Possible sources include geology and mining
Antimony	Sb	
*Arsenic	As	Possible sources include geology and pesticides
Barium	Ba	
Beryllium	Be	
*Cadmium	Cd	Possible sources include metal plating, etc.
*Calcium	Ca	Possible sources include geology and agriculture
*Chromium	Cr	Possible sources include metals plating, wood preservation, etc.
Cobalt	Co	
*Copper	Cu	Possible sources include geology and plumbing
Iron	Fe	Possible sources include geology, mining, and plumbing
*Lead	Pb	Possible sources include leaded gasoline and paint
Magnesium	Mg	
*Manganese	Mn	Possible sources include geology and the production of steel and batteries
*Mercury	Hg	Possible sources include fossil fuels and incinerators
Molybdenum	Mo	
*Nickel	Ni	Possible sources include metal plating, etc.
Potassium	K	
Selenium	Se	
Silver	Ag	
Sodium	Na	Possible sources include geology and mining
Strontium	Sr	
Thallium	Ti	
Tin	Sn	
Titanium	Ti	
Vanadium	V	
*Zinc	Zn	Possible sources include metal plating, etc.

* Findings presented below for these elements

Chapter 9: Results and Findings

Results of the Sediment Core Study are divided into the following four sections: (1) Conventional and Descriptive Findings; (2) Radiometric Dating and Sediment Accumulation Rates; (3) Organic Chemical Findings; and (4) Inorganic Chemical Findings.

Interpretation of study results will consist of the following: (a) spatial comparison between the 11 Finger Lakes; (b) temporal comparisons of chemical patterns within 9 of the 11 lakes – unfortunately, sediment chronologies could not be constructed for Cayuga Lake and Hemlock Lake due to inadequate radioisotope profiles; and (c) comparison of sediment core findings to pertinent sediment quality guidance values and discussion of issues of concern.

As was mentioned earlier, the Finger Lakes offer an excellent opportunity for *spatial* comparisons between similar lake systems. The discussion of results will focus on similarities and dissimilarities in chemical patterns between the various lakes. In certain instances, spatial comparisons between adjacent lake systems can provide important clues regarding the origin(s) of chemical constituents. Such a study can help to delineate whether a contaminant problem is originating within a lake watershed (e.g., local hazardous waste site) or from outside the watershed (e.g., atmospheric deposition). For example, if two adjacent lakes indicate a similar chemical profile it is likely that the source is regional, whereas, if only one of the lakes exhibit the pattern the source is more likely local in nature. Other factors that should be considered in such spatial comparisons include physical (morphology, runoff patterns, etc.) chemical (chemical dynamics), and biological (trophic state, food web, etc.) characteristics of the lake systems.

Temporal comparisons of chemical patterns will be based upon chemical chronologies as recorded in the vertical sediment cores. An intact sediment profile can serve a number of purposes in this regard. *First*, the core profile can provide a historical perspective on chemical trends within the lake. Several scenarios are possible, including: (a) chemical levels could decrease with depth (higher concentrations in upper sediments), indicating an increase in chemical inputs to the system over time, or, alternatively, a reduction in sediment loading and static levels of chemical input; (b) chemical levels could increase with depth (higher concentrations in the deeper sediments), indicating a decrease in chemical input to the system over time, or, alternatively, increases in sediment loading and static chemical input; or (c) chemical levels could remain constant with depth, indicating stable chemical input to the system over time. *Second*, while the entire core is of interest with respect to determining chemical trends over time, the upper segments of the core are of particular interest for the following reasons: (a) *chemical availability*: the upper sediment layers are more readily available to resident biota, and available for exchange with the overlying water column; and (b*) current load*: the upper sediment layers provide a picture of current chemical input to the lake and/or watershed. *Third*, sediment core chemical profiles also provide a comparison to chemical uptake information as recorded in biotic indices (e.g., fish flesh date). Thus, the temporal history of chemical inputs as recorded in the sediment profiles can be compared to temporal trends in fish flesh data for those chemicals routinely monitored in sport fish.

The final task to be addressed in the discussion will be to compare observed chemical levels to applicable sediment quality assessment values. At the present time, there are several sets of sediment quality assessment values available for use in freshwater systems. Selection of appropriate assessment values depends upon the intended purpose (e.g., protection of benthic organisms, bioaccumulation and protection of human health, etc.). Once again, greater scrutiny will be placed on upper sediment layers due to their availability to resident biota and possible exchange with overlying water column, as well as their reflection of recent contaminant patterns within the lake and watershed. Specific assessment values will be presented and discussed within the discussion of organic and inorganic findings below.

a. Conventional and Descriptive Findings

The Finger Lakes sediment cores ranged in length from 45 - 77 cm in length (see Table 9.1), indicating good penetration of bottom sediments. There were no instances of core over-penetration (core being pushed beyond the top of the coring devise).

In general, the upper layers of the sediment cores were brown in color and had relatively high water content, while the lower layers of the cores appeared dark gray to black and exhibited lower water content. The color differences could be due to differences in reduction/oxygenation (redox) conditions between the upper and lower sediment layers. At the time of core collection it is likely that the hypolimnion of all of the lakes, with the exception of Otisco Lake, were oxygenated. Thus, pore water within the upper layers of most of the cores would likely be oxygenated, at least to some degree, due to oxygen exchange with the overlying water. In contrast, the lower sediment layers are uniformly deprived of oxygen due to isolation from an available source of oxygen.

Table 9.1: General characteristics of individual cores

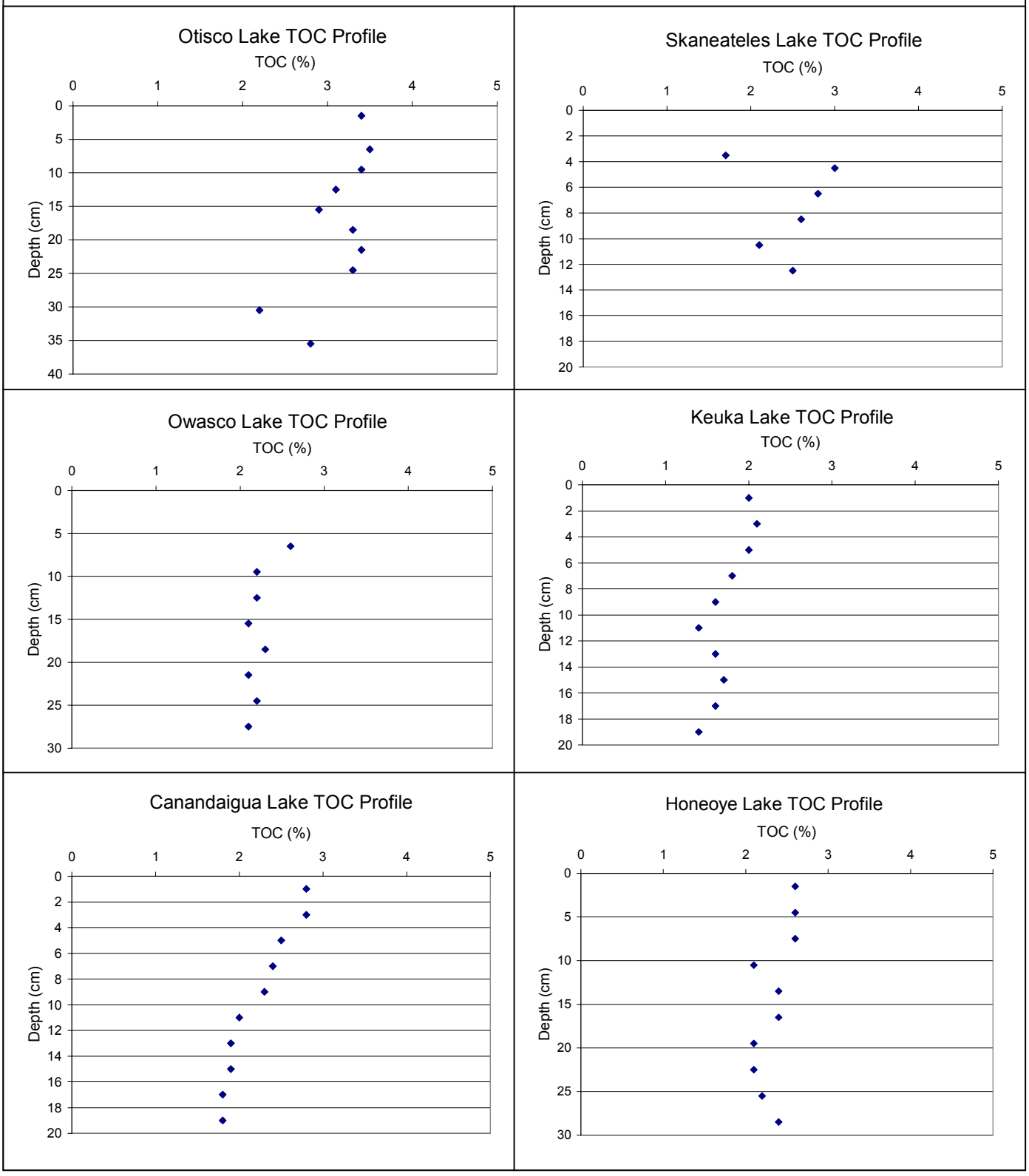
Lake	Length (cm)	Physical Description
Conesus	77	*surface* layers - brown & watery, *deep* layers - black & less water
Hemlock	60	*surface* layers - brown & gray, *deep* layers - black & gray
Canadice	45	*surface* layers - brown, *deep* layers - dark gray to black
Honeoye	62	*surface* layers - brown and gray, *deep* layers - dark gray
Canandaigua	66	*surface* layers - brown, *deep* layers - dark gray to black
Keuka	na	*surface* layers - brown to gray, *deep* layers - dark gray to black
Seneca	69	*surface* layers - brown, *deep* layers - dark gray to black
Cayuga	51	*surface* layers - gray, *deep* layers - dark gray to black
Owasco	61	*surface* layers – brown, *deep* layers - gray
Skaneateles	73	*surface* layers – brown, *deep* layers - gray
Otisco	68	*surface* layers – brown, *deep* layers - gray

Lake sediments are composed of both organic and inorganic materials. The relative percentage of these constituents is indicative of conditions within the lake and it's surrounding watershed. Total organic carbon (TOC) is a common measure used to characterize the benthic sediments of a lake. Organic carbon is composed of plant and animal materials either generated within the lake (autochthonous) or brought to the lake via it's tributary system (allochthonous). In general, sediment TOC levels are expected to parallel the productivity level of the lake – more productive lakes show higher TOC levels while less productive lakes exhibit lower TOC levels.

TOC profiles for 8 of the 11 Finger Lakes are presented in Figures 9.1 and 9.2. As discussed, sediment cores collected from Cayuga and Hemlock Lakes were insufficient for establishing sediment chronologies and are not included. In addition, the Seneca Lake core was not analysed for TOC due to a study oversight.

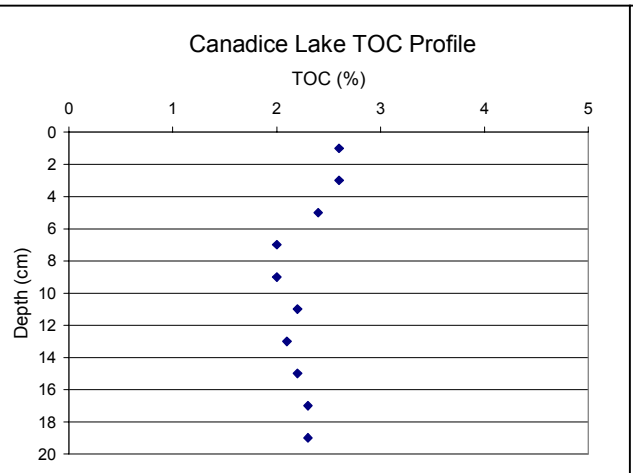
In general, results are reasonably consistent with the premise that benthic TOC levels parallel lake productivity. For example, TOC levels are higher in the Otisco Lake than in Owasco Lake (see Figure 9.1), which is consistent with findings presented above concerning the relative productivity of the two systems. Similarly, TOC levels in upper sediment layers of Conesus Lake are higher than in Canadice Lake (see Figure 9.2), which is again consistent with water quality findings presented above. However, there are some apparent exceptions. For instance, upper layers of Canandaigua and Canadice Lakes show higher TOC levels than would be expected given their productivity levels.

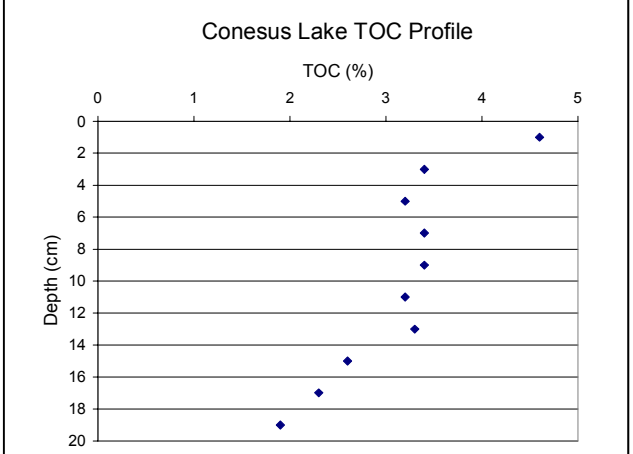
Figure 9.1: Sediment core TOC profiles for 6 of the Finger Lakes (note scale differences)



By contrast, Honeoye Lake, which is relatively productive, showed somewhat lower TOC levels than might have been expected. Findings for Honeoye Lake might be the result of: (a) relatively short retension time of Honeoye Lake, which may limit accumulation of organic matter; and (b) relatively shallow depths and limited stratification – which may keep finer materials in suspension for longer periods.

Figure 9.2: Sediment core TOC profiles for 2 additional Finger Lakes





Temporal trends in TOC levels, as reflected in vertical sediment profiles, can offer some indication of changes in organic loading to a lake over time. However, it is also possible that "apparent" changes are the result of analytical variability. Several of the lake cores indicate an increase in TOC levels beginning in the late 1930s or early 1940s. For example, Canandaigua Lake (Figure 9.1) shows an initial increase in TOC levels beginning at 13.5 cm (circa 1933), and Skaneateles Lake (Figure 9.1) shows an initial increase beginning at 10.5 cm (circa 1944). These observations are consistent with increases in population and development within the watersheds during this time period. In the case of Conesus Lake, TOC levels increase between 19 cm (circa 1950) and 13 cm (circa 1965). However, because we have no record below 19 cm the increase may have begun prior to this point in time. Sediment cores from two of the lakes, Owasco and Keuka Lakes, indicate a more recent increase in TOC levels. The Owasco Lake core shows an increase in TOC at 9 cm (circa 1972), while the Keuka Lake core shows an increase at 11 cm (circa 1971). These more recent TOC increases seem counterintuitive given the observed changes in productivity occuring over the intervening period – stable for Owasco Lake and decreasing for Keuka Lake. TOC trends at the top of the cores suggest fairly stable conditions for most of the lakes. Exceptions include a significant decrease in the case of Skaneateles Lake and a significant increase in the case of Conesus Lake. The direction of these findings are consistent with limnolological findings discussed above in that productrivity levels in Skaneateles Lake have declined markedly over the past several decades while productivity levels within Conesus Lake have increased substantially over the same period. Once again, however, the TOC findings may be analytical anomalies, and would require confirmation from additional cores.

There are no sediment quality assessment values for total organic carbon, however, organic content can play a role in the derivation of organic contaminant assessment values.

b. Radiometric Dating and Sedimentation Accumulation Rates

Radiometric dating is a method of ascribing dates to discreet segments of a vertical sediment core. The process involves analyzing vertical core segments for specific radioisotopes.

Two of the more common radioisotopes used for dating of relatively recent sediments (100 years of age, or less) are cesium 137 (^{137}Cs) and lead 210 (^{210}Pb). The two isotopes are often used in concert for sediment dating purposes, with date estimates of one isotope acting as confirmation of dates established using the other isotope. For this study, cesium 137 (^{137}Cs) is used as the primary isotope, and lead 210(^{210}Pb) is used as the secondary, or confirmatory radioisotope – see further discussion in box below.

Vertical profiles of ^{137}Cs for each of the Finger Lakes sediment cores are presented in Figure 9.3 (eastern 6 lakes) and Figure 9.4 (western 5 lakes). The ^{137}Cs profiles from all but 2 of the lakes (Cayuga and Hemlock Lakes) were deemed acceptable for dating purposes in that they exhibited ^{137}Cs profiles consistent with known fallout trends resulting from nuclear weapons testing.

For example, the Skaneateles Lake plot (Figure 9.3) shows an increase in ^{137}Cs levels from the surface of the core down to approximately 7 cm (cesium peak). This is followed by a decrease in ^{137}Cs levels thereafter down to virtually zero at a sediment depth of approximately 12.5 cm (cesium horizon). This indicates that Skaneateles Lake sediments located at a depth of 7 cm were deposited at or around the peak in above-ground nuclear weapons testing in 1963, and that sediments at a depth of 12.5 cm were deposited at or around the onset of large-scale nuclear weapons testing in the early 1950s. Similar trends of increasing ^{137}Cs levels to a given depth, followed by decreasing levels thereafter were observed for 7 of the other Finger Lakes (Conesus, Canadice, Canandaigua, Keuka, Seneca, Owasco, and Otisco Lakes), and an acceptable ^{137}Cs horizon was available for an additional lake (Honeoye Lake). Table 9.2 provides a summary of ^{137}Cs markers for the Finger Lakes.

Table 9.2: Depth of ^{137}Cs markers

	^{137}Cesium	
Lake	Peak (cm)	Horizon (cm)
Conesus	13	19.5
Hemlock	na	na
Canadice	5	9
Honeoye	na	19.5
Canandaigua	7	13
Keuka	13	21
Seneca	7	15
Cayuga	na	na
Owasco	12.5	24.5
Skaneateles	6.5	12.5
Otisco	24.5	na

^{137}Cs profiles for Cayuga Lake and Hemlock Lake sediment cores were not sufficient for determination of time chronologies.

In contrast to the "well behaved" cores discussed above, the ^{137}Cs trends in Cayuga Lake (Figure 9.3) and Hemlock Lake (Figure 9.4) do not show a pattern of ^{137}Cs deposition consistent with known fallout patterns. It is possible, that the ^{137}Cs profile for Cayuga Lake is intact but incomplete (^{137}Cs peak is present, but horizon is not present). However, if this is so, than the sedimentation rate within Cayuga Lake is extremely high (approaching 1 cm/year). Fortunately, in the case of Cayuga Lake, previous coring efforts conducted by the United State Geological Society (Yager, 1999) provided acceptable estimates of sedimentation rates and sediment chronology. Unfortunately, no alternative source of data is available for Hemlock Lake.

In summary, reasonable temporal chronologies and sediment accumulation rates (SAR) are available for 10 of the 11 Finger Lakes, and acceptable sediment chronologies are available for 9 of the 11 lakes.

Radiometric Dating (^{137}Cs and ^{210}Pb)

Rainfall and erosion activities within a lake watershed result in the transport of sediments and associated chemicals to a lake. These suspended sediments, or a portion thereof, eventually "rain" down from the water column and reach the lake bottom. If these sediments come to rest in so-called depositional areas of a lake they record the temporal history of chemical inputs to the lake. By extracting and vertically segmenting these sediments (sediment cores) one can document historical chemical patterns within a lake. However, in order to ascribe specific dates to individual core segments one must identify temporal markers that can be used to date the given segment. Temporal markers can include either chemical (e.g., radioisotopes) or biological (e.g., pollen) constituents of the sediments. In this study we used two radioisotopes (^{137}Cs and ^{210}Pb) to date sediment core segments. The methods used to derive sediment dates vary for the two radioisotope markers. Dates associated with ^{137}Cs are premised on temporal markers associated specific historical events, while dates derived from ^{210}Pb are based upon the natural decay of the isotope.

^{137}Cs is a byproduct of nuclear weapons testing. Atmospheric testing of nuclear weapons began in the 1940s, accelerated through the 1950s and early 1960s, and declined thereafter (replaced by below-ground weapons testing). This historical chronology provides two distinct temporal markers associated with ^{137}Cs deposition as follows: (1) ^{137}Cs *horizon*: which refers to the first appearance of ^{137}Cs in the environment – generally considered to represent the early 1950s (e.g., 1952) – resulting from large-scale nuclear weapons testing; and (2) ^{137}Cs *peak*: which refers to the period of maximum above-ground nuclear testing and subsequent ^{137}Cs fallout – generally considered to have occurred in the early 1960s (e.g., 1963) – resulting from "unloading" of weapons stockpiles in advance of a world-wide atmospheric test ban treaty in 1964. Figures 9.5 and 9.6 depict world-wide above-ground nuclear weapons testing and ^{137}Cs fallout in Finland, respectively.

^{210}Pb is a naturally occurring uranium (U) isotope. Major intermediate isotopes in the decay of 238Ur, and their approximate half-lives (years), are as follows:

^{238}U (4.5×10^9) → ^{234}U (2.5×10^5) → ^{230}Th (7.5×10^4) → ^{226}Ra (1.6×10^3) → **^{210}Pb** (22.3) → ^{206}Pb (stable)

The half-life of ^{210}Pb (22.26 years) provides a reference by which to estimate sediment dates within lake sediments. The process involves the following steps: (1) plot $^{210}Pb_{ex}$ concentrations within the vertical sediment core against sediment depth, (2) determine the depth of sediment accumulation which results in a halving of excess ^{210}Pb levels; and (3) divide this value by the half-life of ^{210}Pb.

Figure 9.5: Above ground nuclear weapons testing estimated yield

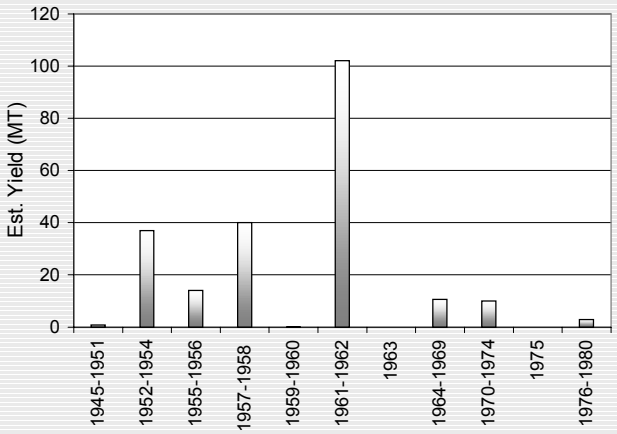


Figure 9.6: Record 137Cs fallout – Finland

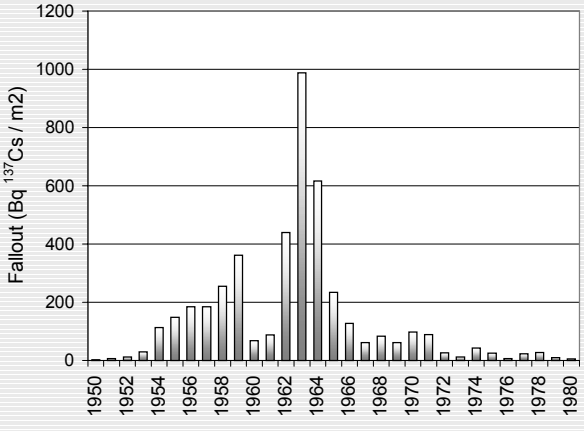


Figure 9.3: Sediment core ^{137}Cesium profiles for 6 eastern lakes (note scale differences)

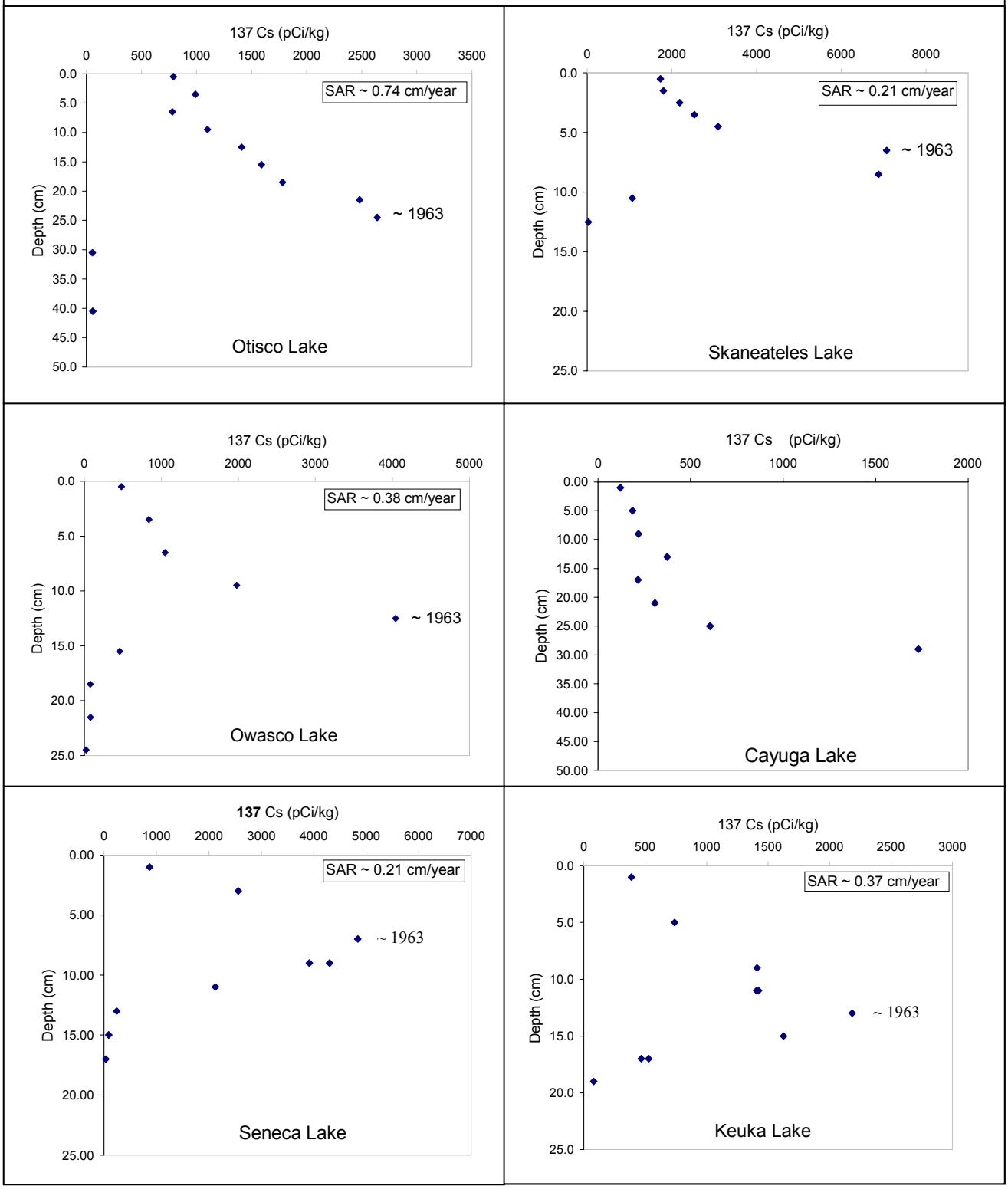
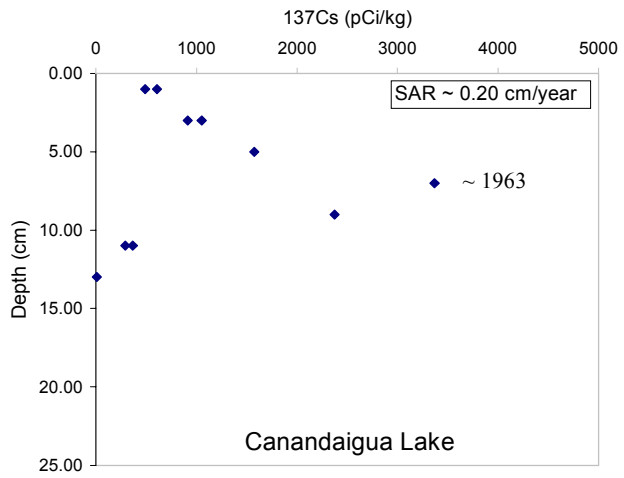
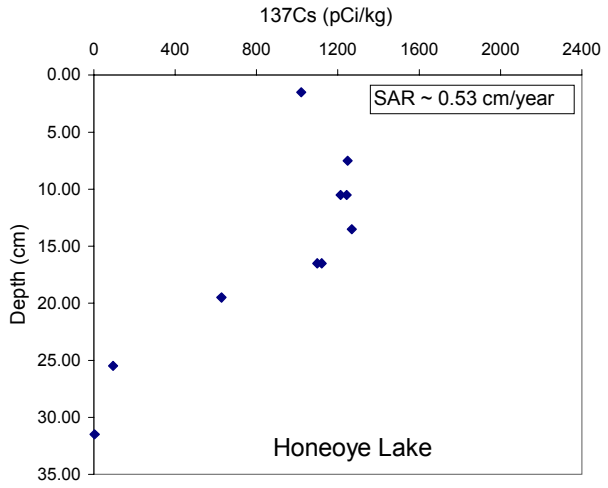
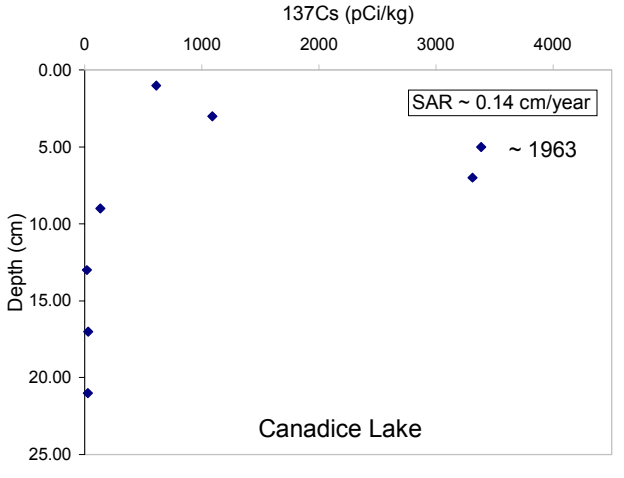
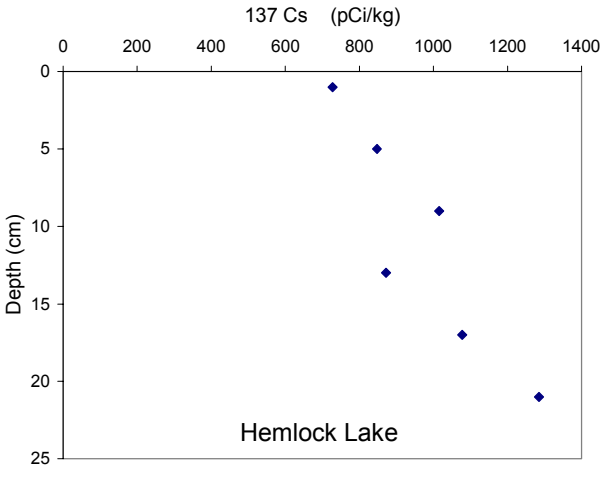


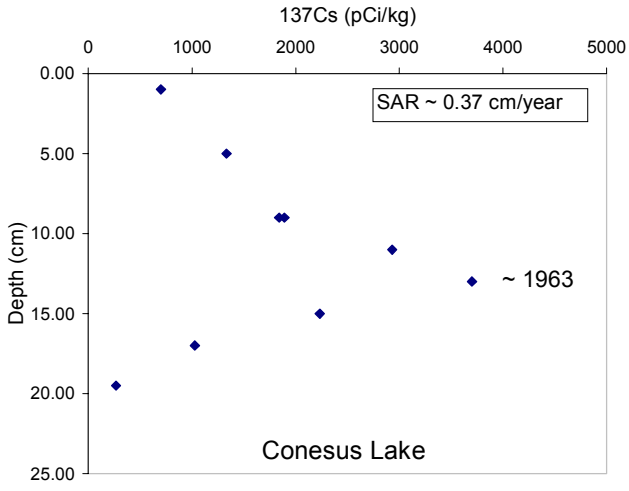
Figure 9.4: Sediment core ^{137}Cesium profiles for 5 western lakes (note scale differences)











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Sediment accumulation rates (SARs) for each of the Finger Lakes, as derived from both ^{137}Cs profiles (both peak and horizon) and ^{210}Pb profiles, are shown in Table 9.3. It is important to keep in mind that the reported SARs are for a single location within each lake, and that some longitudinal variation would be expected – particularly, for the larger (longer) lakes. The SAR shown for Cayuga Lake is based on an average of 6 cores collected by the USGS (Yager, 2001) during the early to mid 1990s. SARs, based upon ^{137}Cs, range from 0.17 cm/year for Canadice Lake to 0.74 cm/year for Otisco Lake. The rates derived by both ^{137}Cs markers (peak and horizon) and ^{210}Pb are reasonably consistent for each lake. The only major exception to this finding was for Otisco Lake, which shows a higher SAR based upon ^{137}Cs than that based on ^{210}Pb. The reason for this disparity is not clear.

Table 9.3: Sediment accumulation rates (cm/year)

Lake	^{137}Cesium		^{210}Lead	Comments
	Peak	Horizon		
Conesus	0.37	0.42	0.41	
Hemlock	na	na	na	No useable data
Canadice	0.17	0.23	0.23	
Honeoye	na	0.53	na	No discernible ^{137}Cs peak
Canandaigua	0.20	0.25	0.3	
Keuka	0.37	0.40	0.45	
Seneca	0.23	0.33	0.32	
Cayuga	0.42	na	na	Based on USGS data (Yager, unpublished)
Owasco	0.38	0.5	0.45	
Skaneateles	0.21	0.28	0.26	
Otisco	0.74	na	0.54	^{137}Cs rate ~ 40 percent higher than ^{210}Pb rate

The sediments within a lake can originate in two principle ways: (1) externally: sediments can be eroded from the lake catchment and delivered via the tributary system to the lake – this typically includes both organic and inorganic sediments; and/or (2) internally: sediments can originate internally via the growth and senescence of plant (phytoplankton and macrophytes) and animal communities – these are strictly organic sediments.

If the sediments of a lake are primarily of internal origin (algal growth and senescence) then the SAR is likely to reflect the long-term trophic state of the lake. The SARs derived for the Finger Lakes are reasonably consistent with trophic state findings presented earlier in that the eutrophic Finger Lakes (e.g., Otisco and Honeoye Lakes) generally exhibit higher SARs than do the oligotrophic Finger Lakes (e.g., Skaneateles and Canandaigua Lakes). These findings are consistent with expectations, in that higher trophic status reflects greater productivity which results in greater particulate material available for deposition. There are, however, some apparent anomalies to this general finding.

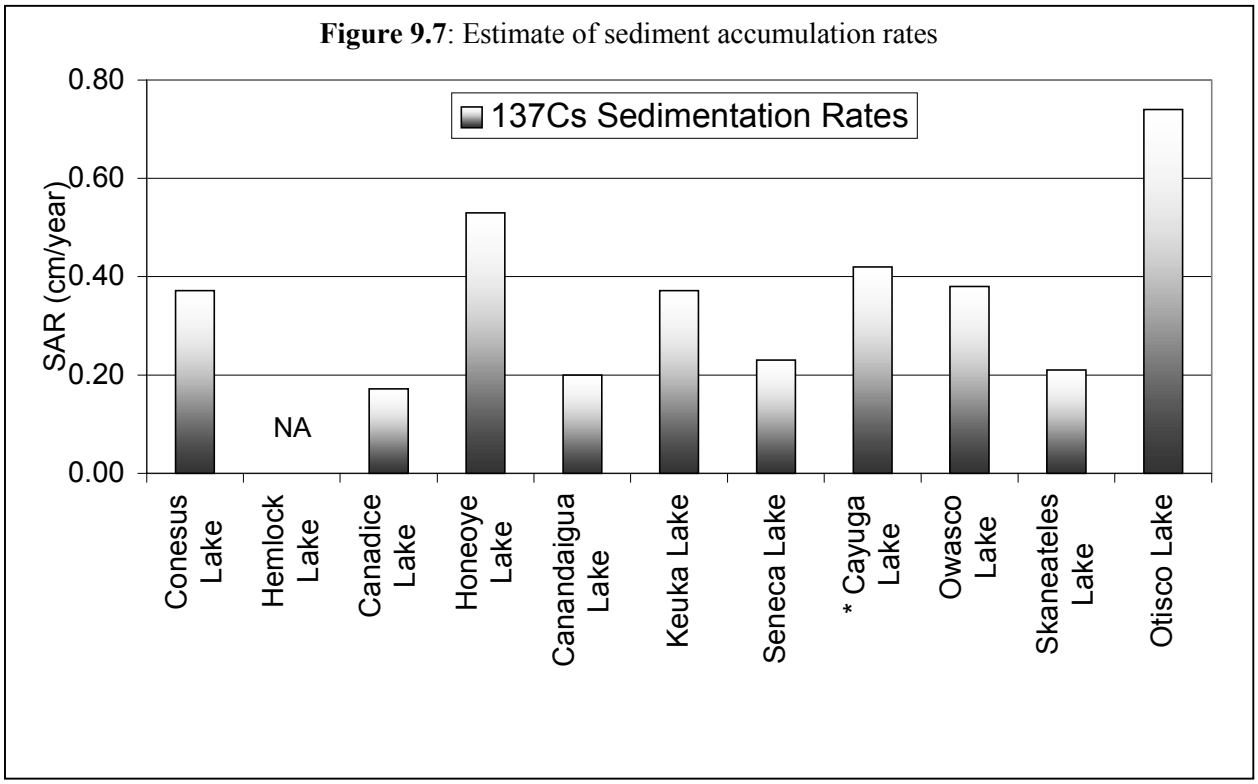
For example, the SAR for Cayuga Lake is slightly greater than that for Conesus Lake, whereas, the current trophic state of Conesus Lake is greater than that of Cayuga Lake. There are several possible explanations for this apparent disparity. First, SARs, by definition, represent an integration of conditions over time, whereas, trophic status is a snapshot in time. You may recall from the earlier discussion of trophic state that the trophic status of Cayuga Lake (main lake) has dropped significantly since the 1970s as reflected in total phosphorus and chlorophyll a levels (see Tables 5.3 and 5.4). Thus, the SAR for Cayuga Lake, or any waterbody, is indicative of long-term conditions, and may be somewhat inconsistent with conditions at any one instant in time. Second, the Cayuga Lake cores used for derivation of SAR were all collected in the southern third of the lake and may be somewhat biased due to conditions in the south end of the lake (e.g., tributary inflow, sewage discharge, etc.) which is considerably more productive than the deeper basin of the lake.

Figure 9.7 provides a graphical comparison of SARs within the Finger Lakes based upon ^{137}Cs findings. The rates presented are best estimates of sediment accumulation rates based on radiometric measures and selected chemical markers.

The SARs presented for Conesus, Canadice, Keuka, Owasco, Skaneateles, and Otisco Lakes are based upon the ^{137}Cs peak observed in each of the cores. The rates presented for both Seneca Lake and Canandaigua Lake are based upon the ^{137}Cs horizon observed in the respective cores. The reason for use of this modified approach for these particular cores stems from observations of specific chemical markers (see discussion of DDT and metabolites below). As with ^{137}Cs, these organic substances have a fairly well defined temporal history that can be used to "fine-tune" the radiometrically derived chronology. Thus, when this sort of additional information is available, one generally takes a "weight of the evidence" approach in interpreting sediment chronology and assessing accumulation rates.

Finally, as discussed earlier, the SAR reported for Cayuga Lake represents an average SAR based upon the ^{137}Cs peaks observed in 6 cores taken by USGS in the early 1990s (Yager, 2001).

Figure 9.7: Estimate of sediment accumulation rates



c. Organic Chemical Findings

The suite of organic chemicals analyzed during this investigation are shown in Table 8.2. Of the approximately 25 substances investigated, only a few were present at detectable levels within the Finger Lakes sediment cores. The substances detected most often include: (1) dichlorodiphenyl-trichloroethane (DDT) and related compounds dichlorodiphenyl-dichloroethylene (DDE) and dichlorodiphenyl-dichloroethane (DDD); and (2) Polychlorinated biphenyl's (PCBs). Both groups of substances are termed organochlorines, and have largely been banned for use in the United States. However, these substances continue to cycle through many aquatic environments due to their persistence and ability to bioaccumulate. As discussed earlier, these are the chemicals responsible for the current fish consumption advisories in Canadice Lake (PCBs), Canandaigua Lake (PCBs), and Keuka Lake (DDT).

As alluded to earlier, several sets of sediment quality assessment values are available for use in freshwater systems. Representative values for organic chemicals at issue within the Finger Lakes are presented in Table 9.4. The values are taken from a compilation of sediment criteria compiled by Smith et al. (1996). The threshold effect level (TEL) implies occasional adverse effects on resident biota, whereas, the probable effect level (PEL) implies frequent adverse effects on biota.

Table 9.4: Sediment guidance criteria for selected organic chemicals

Substance	TEL (ppb)	PEL (ppb)
Total DDT	7	4,450
Total PCBs	34.1	277

TEL: threshold effect level (Smith, et al., 1996)
PEL: probable effect level (Smith, et al., 1996)

DDT and Related Compounds

DDT is a synthetic (human-made) insecticide composed of carbon, hydrogen and chlorine atoms (see further discussion in box below). DDT gained widespread use in the 1940s following World War II. Once heralded as the "savior of mankind" due to its ability to control the insect vectors responsible for the spread of many human diseases, DDT began to fall out of favor in the 1960s as concerns over its efficacy and safety (environmental and human health) came into question. DDT was banned for use in the United States in 1972, however, the compound is still in use in several developing countries (e.g., Mexico).

Findings for DDT and its metabolites are only available for 7 of the 8 western Finger Lakes, as cores from the 3 eastern lakes and Honeoye Lake were not analyzed for these compounds.

Spatial comparisons of the lakes indicate that DDT was detectable in certain segments of all 7 of the lakes evaluated, however, levels varied significantly between lakes (see Table 9.5). From a historical context, Keuka Lake had the highest ΣDDT (DDT + DDD + DDE) level, which occurred in the 12-14 cm sediment increment. The fact that Keuka Lake exhibited the highest DDT levels is not surprising given the standing fish consumption advisory on Keuka Lake. Two of the other Finger Lakes, Seneca and Canandaigua Lakes, also showed relatively high historical ΣDDT levels – note the peak levels of 153 ppb and 219 ppb, respectively. With respect to DDT levels in surface sediments, Keuka Lake again shows the highest ΣDDT levels (72 ppb), followed by Seneca Lake (40 ppb) and Conesus Lake (30 ppb). As noted earlier, it is not possible to discern temporal trends in the Cayuga and Hemlock cores do to apparent mixing within the core sediments, however, both cores exhibited detectable ΣDDT levels – somewhat higher in Hemlock Lake than in Cayuga Lake. It is important to view these findings as composite or aggregate values.

DDT and Related Compounds

DDT was initially synthesized by a German graduate student in 1874. However, more than half a century would pass before the commercial utility of the compound became known. In 1939, a Swiss entomologist named Dr. Paul Muller found that DDT was a potent insecticide. The importance of Muller's discovery is underscored by the fact that he was awarded the Nobel Prize in Medicine in 1948 due to the importance of DDT in the control of several human diseases. Following its initial use to control insect vectors of human diseases (e.g., malaria, typhus, yellow fever, etc.), DDT was eventually used to control a broad array of insect pests (both agricultural and non-agricultural pests). The list of target insects included codling moths (important pest in fruit orchards), spruce bud worms (important pest in silvaculture), and elm bark beetles (vector for Dutch Elm disease).

While of significant importance in the control of both human disease vectors and insect pests in general, environmental and human health concerns relating to DDT began to arise in the late 1940s and 1950s. These concerns would reach a worldwide audience with the release of Silent Spring (Carson, 1962). Use of DDT in the United States peaked in the early 1960s, and declined thereafter for the following reasons: (1) development of resistance in certain target species; (2) concerns regarding its effects on the environment and human health; and (3) introduction of alternative insecticides. DDT use was banned in the United Sates in 1972, however, several countries continue to use the compound.

DDT consists of two phenyl (six carbon hexagon) rings - thus diphenyl - with 2 chlorines attached to the ring structures and 3 additional chlorine molecules attached to the central carbon molecule. The chemical structure of DDT is shown in Figure 9.8. The two principal metabolites (or breakdown products) of DDT are DDE and DDD (Figures 9.9 and 9.10, respectively). DDD was actually marketed separately as an insecticide, while DDE has never been marketed commercially and is only found as a by-product of DDT breakdown. While DDT and its metabolites can be degraded within the environment, the rate of degradation is quite slow.

As with other organochlorine compounds, DDT has a strong affinity for organic material and will accumulate within lipid (fat) deposits of living organisms. This propensity for DDT and related compounds to concentrate within biota is termed bioaccumulation. This process, coupled with the compound's persistence within the environment, has led to significant environmental problems. The most widely heralded being the precipitous decline in predatory bird populations (e.g., Bald eagles) in North America due to eggshell thinning and embryo deaths.

DDT and its metabolites have been shown to cause chronic adverse health effects on the liver, kidneys, nervous system, immune system, and reproductive system in experimental animals. In addition, the USEPA considers these compounds to be suspected human carcinogens. Fish consumption advisories (e.g., Keuka Lake) are based upon a United States Food and Drug Administration (FDA) limit of 5 ppm.

Figure 9.8: Structure of DDT
Chlorine molecule (green)

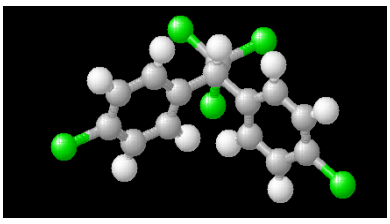


Figure 9.9: Structure of DDE
Carbon molecule (gray)

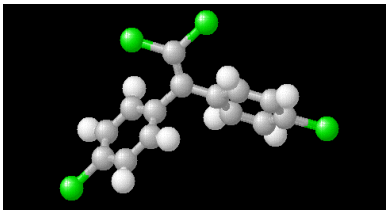
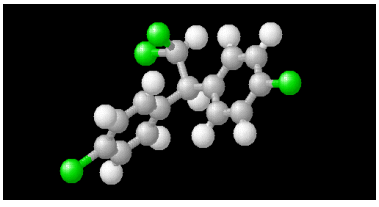


Figure 9.10: Structure of DDD
Hydrogen molecule (white)



Figures from: http:www.atsdr.cdc.gov

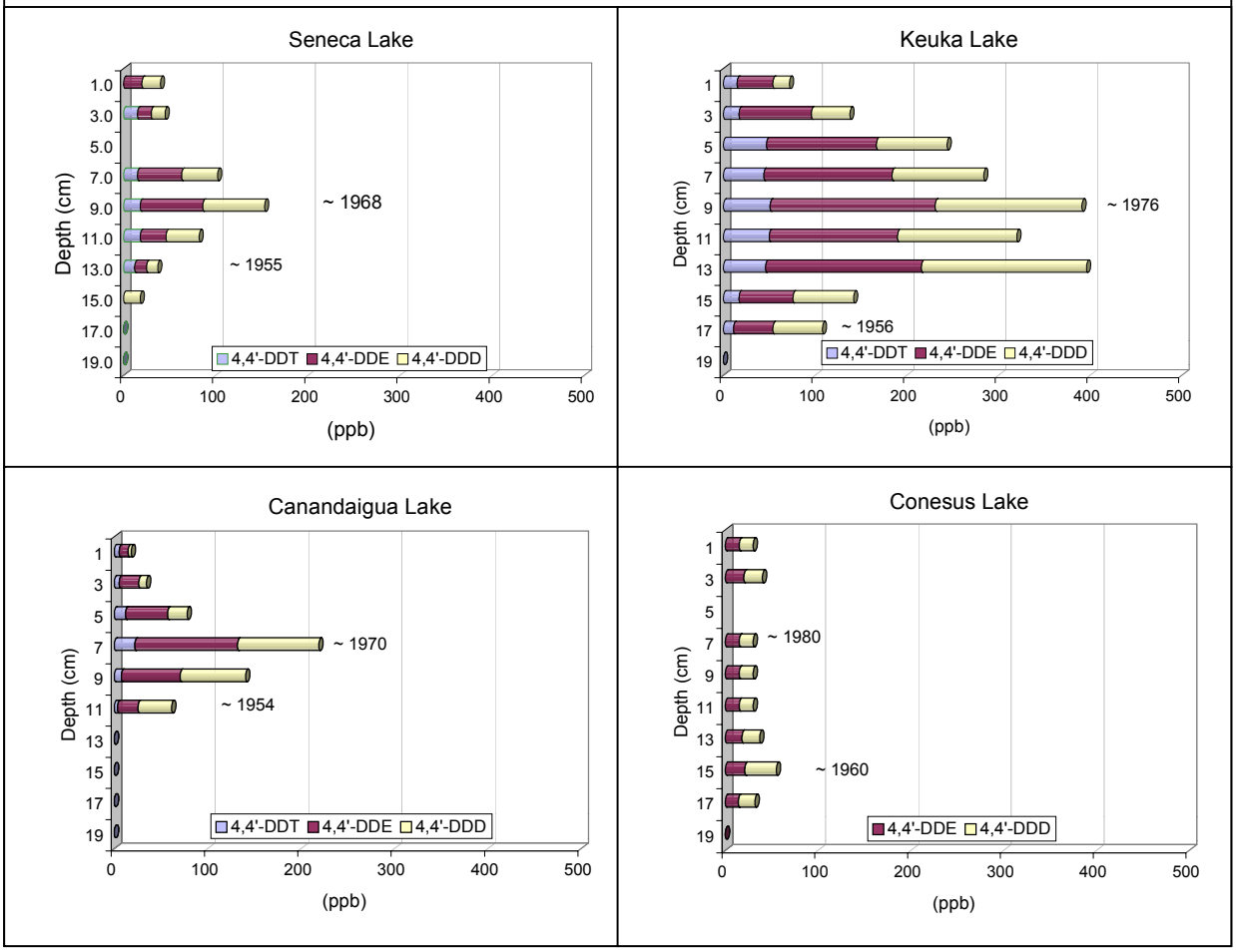
Table 9.5: Finger Lakes sediment cores Σ DDT summary

Lake	*Peak Σ DDT (ppb)*	*Surface Σ DDT (ppb)*	*Comments*
Cayuga	30 – depth na	na	no temporal significance
Seneca	153 @ 8-10 cm	40	second highest surface level
Keuka	396 @ 12-14 cm	72	DDT-based fish consumption advisory
Canandaigua	219 @ 6-8 cm	18.2	Second highest peak level
Honeoye	na	na	
Canadice	65 @ 6-8 cm	5.6	
Hemlock	54 – depth na	na	no temporal significance
Conesus	55 @ 14-16 cm	30	

TEL: 7 ppb
PEL: 4,450 ppb

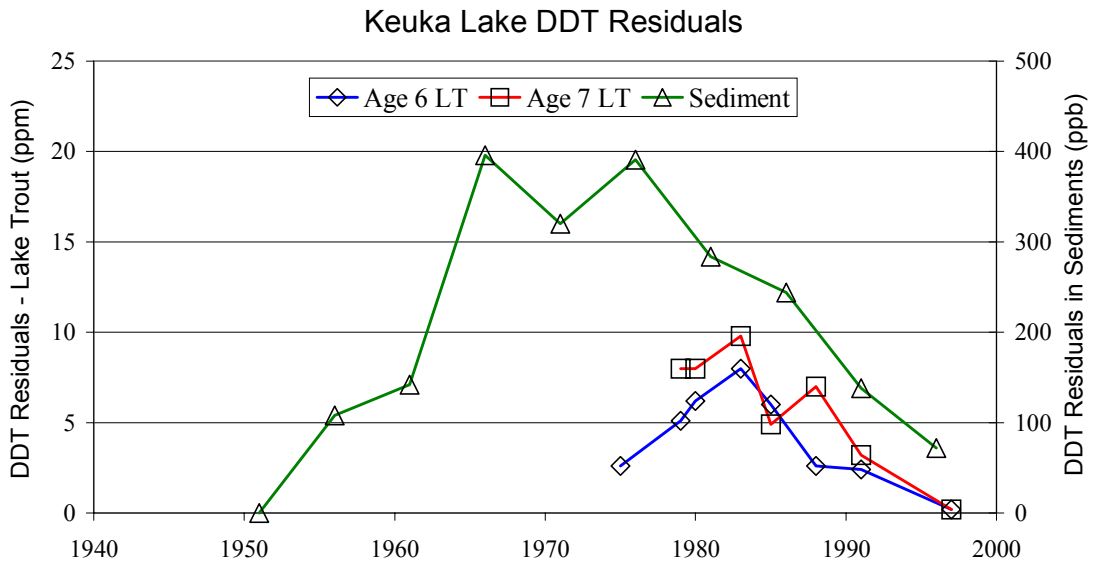
In general, DDT levels within the western 7 lakes are declining in both the sediments and biota. Temporal profiles of DDT, DDE, and DDD from sediment cores taken in 4 of the Finger Lakes are presented in Figure 9.11. Trends indicate that DDT and its metabolites have been declining over the past several decades within the study lakes. For example, ΣDDT levels in Keuka Lake sediments have declined by more than 5 fold from nearly 400 ppb in the mid 1970s to approximately 70 ppb in the mid 1990s. Steep declines are also apparent in both Seneca Lake (~ 4 fold decline over 30 years) and Canandaigua Lake (~ 12 fold decline over 30 years). The temporal pattern observed in Conesus Lake is somewhat different than the other three lakes. For instance, Conesus Lake does not show the marked decline in ΣDDT levels exhibited by the other 3 lakes. On the other hand, historical ΣDDT levels in the sediments of Conesus Lake are considerably less than in the other 3 lakes. Another temporal difference relates to the date of the observed peak in ΣDDT levels. For the 3 larger lakes, the peak in ΣDDT levels coincides with the late 1960s and early 1970s, whereas the peak for Conesus Lake is somewhat earlier (~ 1960). One additional difference relates to the relative proportions of DDT and it principal metabolites DDE and DDD. The 3 larger lakes exhibited detectable levels of the parent compound in most of the core segments, while Conesus Lake only contained detectable levels of the metabolites. While this pattern difference might be explained by the relatively low concentrations of ΣDDT found in Conesus Lake, an alternative explanation is that it might reflect the relative age of the DDT signal. A common approach used to estimate the "age" of a DDT source is to compare the relative ratios of the parent compound (DDT) to its metabolites (DDE and DDD). Obviously, the absence of a detectable DDT signal in the Conesus Lake core, would indicate an enrichment of the metabolites relative to the parent compound. Thus, it is conceivable that the original source of DDT contamination within Conesus Lake is somewhat older than in the other lakes. This is consistent with the observation that the peak in ΣDDT within Conesus Lake is approximately 10 years earlier than in the other 3 lakes. However, this raises the question of why the levels of ΣDDT in Conesus Lake sediments have not declined significantly within recent years. Plausible explanations for the observed plateau in ΣDDT levels within Conesus Lake include: (1) possible use of DDD within the watershed - DDD was used independently as an insecticide in the US for several years following the ban on DDT; (2) more effective ecosystem recycling of DDT and it's metabolites – Conesus Lake is substantially shallower than the other three Finger Lakes and may be more susceptible to resuspension events; (3) ongoing release of metabolites within the watershed.

Figure 9.11: Sediment core profiles of DDT, DDE, and DDD for selected Finger Lakes



Fish flesh analyses have been conducted on sport fish taken from the Finger Lakes for several decades. This data is the basis for the fish consumption advisories currently in place for several of the Finger Lakes and other water bodies within New York State. As with the sediment profiles, DDT trends in fish within the Finger Lakes have also been decreasing (see Figure 9.12). For example, lake trout (ages 6 & 8 years) from Keuka Lake have shown a 30-40 fold reduction in ΣDDT level over the past decade and a half. The US Food and Drug action level for DDT in fish flesh is 5 ppm, and the most recent data indicate that Lake trout from all age ranges are below this level. It is also interesting to compare the pattern of reduction between the sediments and the fish. There is a noticeable delay between the peak in sediment concentrations and the peak in fish concentrations (see Figure 9.12). This is consistent with expectations in that fish accumulate these compounds over time and reflect environmental conditions in aggregate, while specific sediment core segments represent conditions at a discreet instance in time. Fish flesh data for the other Finger Lakes are less extensive than for Keuka Lake, however, the general trend is toward decreasing levels of DDT contamination.

Figure 9.12: Comparison of ΣDDT levels in fish flesh and sediments from Keuka Lake.



Beginning in 1996, the NYSDEC Division of Fish, Wildlife and Marine Resources initiated an investigation within the Keuka Lake watershed in an effort to track down the source(s) of DDT (and related compounds) to the lake (Spodaryk, et al., 2000). The investigation involved the deployment of passive in-situ chemical extraction samplers (PISCES) on various tributaries within the watershed. Findings indicated elevated ΣDDT levels in Tributary 64, which enters Keuka Lake near Bluff Point. The probable source of the DDT to Tributary 64 was determined to be an old disposal area just upstream from Central Avenue in Keuka Park. Track down efforts were concluded in 1999, due to the continuing decline in ΣDDT levels recorded in Keuka Lake biota.

Sediment quality assessment values for ΣDDT are listed in Table 9.4. Once again, the primary focus of this discussion will be on surficial sediments due to biological availability considerations. Surficial sediment ΣDDT levels in 4 of the 5 Finger Lakes with available DDT data are above the TEL guidance level of 7 ppb. Canadice Lake was the only one of these lakes that had surficial sediment levels below the TEL. It is not possible to determine the surficial ΣDDT levels in Cayuga and Hemlock Lakes – due to apparent disturbance of these sediments. None of the Finger Lakes sediment cores showed ΣDDT levels above the PEL of 4,450 ppb. It should be noted, however, that the PEL was not even exceeded within the Keuka Lake sediment core (at any depth), which has had a fish consumption advisory for a number of years due to DDT levels within certain fish species. Thus, failure to exceed the existing PEL should not be interpreted as precluding fish tainting. Peak historical ΣDDT levels observed in Keuka, Canandaigua, and Seneca Lakes warrant consideration should dredging activities within near shore areas be considered in the future, or if unusually large hydrologic events occur. Such activities could conceivably disturb and remobilize these DDT-laden sediments.

PCBs – Arochlors and Congeners

As with DDT and its metabolites, PCBs are a class of man-made organic compounds composed of carbon, hydrogen and chlorine atoms (see further discussion in box below). Originally introduced for industrial use in 1929, US production of PCBs reached a peak of 85 million pounds in 1970 (HHS, 1993). PCBs were used for a wide variety of industrial applications ranging from electrical transformers to carbon-less copy paper. The use of PCBs within the United States has been greatly curtailed over the past several decades.

PCBs tend to bioaccumulate due to their environmental persistence and lipophilic/hydrophobic nature. The property of persistence allows PCBs to circulate for extended periods within the environment, while the properties of lipophilicity and hydrophobicity facilitate the molecule's association with organic and particulate matter, respectively.

PCB analyses can involve quantification of either Aroclors (commercial product composed of specific congeners) or individual congeners. Figure 9.13 provides a visual illustration of a number of the major Aroclor formulations. Given the analytical costs associated with the two methods (congener method is significantly more expensive than Aroclor method), most of the analyses from this study focused upon Aroclors. Aroclor analyses were conducted on approximately 8-10 core segments from each sediment core from the western eight lakes, while congener analyses were run on only one segment from each of the Finger Lakes cores.

As it turns out, most of the Aroclor analyses conducted during this investigation were below detection. Only one sediment core segment, Canadice Lake (2-4 cm), showed reportable Aroclor levels (Aroclor 1260 at 67 ppb). On the other hand, all sediment cores for which congener analyses were conducted showed reportable levels of congeners. Total congener values for these sediment cores are included in Table 9.6. The table includes both actual totals and adjusted totals (total congeners minus p,p'DDE + IUPAC-85, which co-elute on the chromatogram). As can be seen in Table 9.6, this adjustment is important for several of the Finger Lakes (Keuka and Seneca Lakes). This is consistent with findings discussed above concerning past DDT contamination in these lakes. PCB levels were highest in Conesus, Canadice, Seneca, and Owasco Lakes. Keuka, Otisco, and Skaneateles Lakes fall into an intermediate category, and Honeoye Lake showed the lowest PCB levels. It is important to note that the reference timeframes differ among the lakes, ranging from the early 1970s to the early 1990s. Total congener levels found in the Cayuga Lake core segment were also quite low, however, the Cayuga core segment must be viewed as a composite, rather than a discrete moment in time, due to the failure to establish an intact cesium profile.

Table 9.6: Total congeners for Finger Lakes core segments

Lake	*Approximate Date*	*Σ Congeners (ppb)*	**Adjusted Congeners (ppb)*
Conesus Lake	1985	490	481
Hemlock Lake	na**	67	62
Canadice Lake	1973	352	342
Honeoye Lake	1990	69	65
Canandaigua Lake	na	na	na
Keuka Lake	1986	449	289
Seneca Lake	1978	466	408
Cayuga Lake	na**	76	74
Owasco Lake	1987	374	370
Skaneateles Lake	1984	286	278
Otisco Lake	1991	245	243

*: Total congeners minus IUPAC-85 and DDE
**: not appropriate due to failure of radiometric dating

PCBs

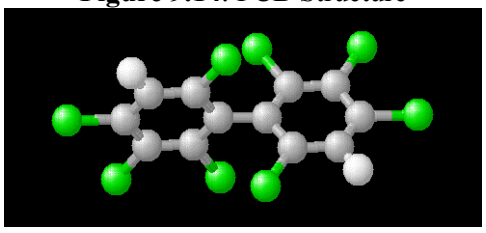
PCBs (see Figure 9.14) were originally synthesized in the late 1800s, but were not used commercially until the late 1920s. The Monsanto Company was the sole manufacturer of PCBs in the US (CEC, 1996). From an industrial perspective, PCBs offer a number of attractive properties. The properties of greatest value to industry include low conductivity (good insulator), flame retardant, and chemical stability. PCBs were used in products ranging from electrical transformers to carbon-less copy paper. The total quantity of PCBs produced in the US between 1929 and 1977 is estimated at 1.4 billion pounds (635 million kilograms) (CEC, 1996) – see Figure 9.15. Electrical transformers and capacitors accounted for 61 percent of PCB use prior to 1971, and 100 percent of PCB use from 1971-1979 (NAS, 1979).

PCBs are composed of two benzene rings and from 1-12 chlorine atoms (see Figure 9.14). Such a structure affords up to 209 possible permutations, which are termed *congeners*. Commercial PCB formulations have specific mixtures of congeners. The commercial mixtures used within the US have the trade name of *Aroclors*. Seven Aroclor formulations (1016, 1221, 1232, 1242, 1248, 1254, and 1260) account for 98 percent of the PCBs sold in the US since 1970. Aroclor numbers (except 1016) can be interpreted as follows: first 2 digits refer to the number of carbon atoms present (two benzene rings contain 12 carbon atoms), while the later 2 digits is the approximate weight percentage of chlorine (i.e., Aroclor 1242 is approximately 42 percent chlorine). The three Aroclor formulations most often associated with contamination sites are Aroclors 1242, 1254, and 1260 (see Figure 9.13).

PCBs were first recognized as potential environmental contaminants by a Swedish researcher in the mid-1960s. Studies indicated PCB accumulation in several hundred pike collected throughout Sweden, and in one eagle (Jensen, 1966). Since that time, many studies have documented bioaccumulation of PCBs in fish and wildlife throughout the environment. PCBs are known to cause cancer in laboratory animals, and are suspected to cause cancer in humans (USDOH, 1993). Oral exposure, through consumption of contaminated food, is believed to be the major route of PCB exposure in the general population (USDOH, 1993).

PCB regulation began in the US in the mid to late 1970's under the Toxic Substances Control Act. Under current regulation, PCBs are banned from manufacture, import, export, and use except under limited circumstances. PCB-containing products or equipment are regulated based on concentration. The most stringent regulation applies to products with PCB concentrations greater than or equal to 500 ppm - regulations include limited disposal options, and storage, marking, location, and record keeping requirements (CEC, 1996). PCB releases are also regulated by the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act (RCRA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Figure 9.14: PCB Structure



From:
http://www.atsdr.cdc.gov/

Figure 9.15: US Domestic PCB Sales (NIOSH, 1975)

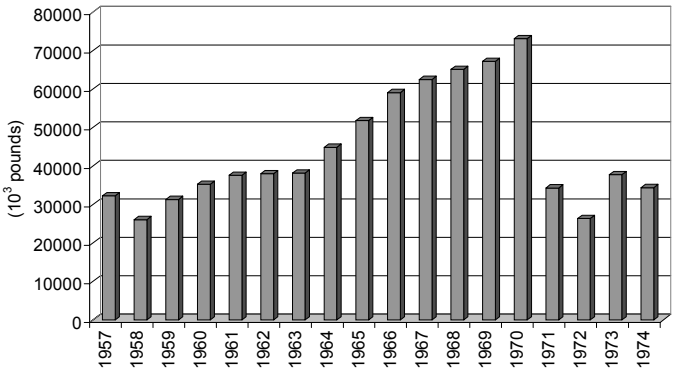
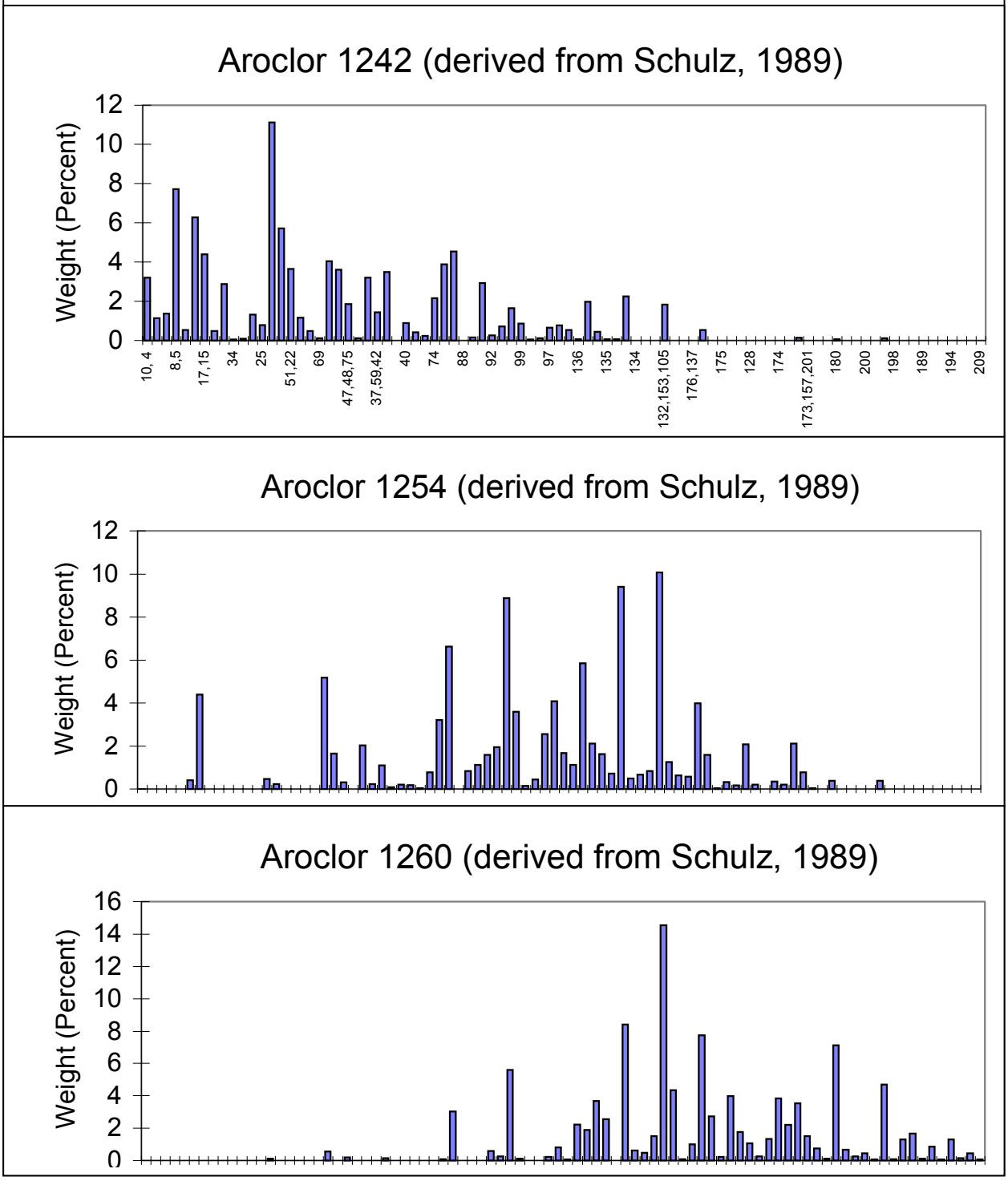


Figure 9.13: Congener pattern for various PCB Aroclor formulations (from Schulz, 1989)



PCB results do not indicate any spatial patterns within the Finger Lakes. However, the congener patterns in several of the Finger Lakes cores (Figure 9.16) suggest differences in contaminant patterns. Once again, while all three core segments were collected from a similar sediment depth (4-6 cm), the time periods represented by the segments vary due to differences in sediment deposition rates within each lake. The Conesus Lake core segment represents sediments deposited during the mid 1980s, while the core segments from Canadice and Seneca Lakes, represent sediments deposited during the early 1970s and the late 1970s, respectively. While as mentioned above, laboratory assessment of Aroclors were all below detection levels with the exception of a single core segment from Canadice Lake, the congener data does appear to provide some clues as to possible parent compounds. Thus, comparison of congener patterns observed within the lakes (Figure 9.16) to those of commercial products in most common use within the United States (Figure 9.13), provides some perspective with respect to possible contaminant sources. The congener profiles from Conesus Lake and Canadice Lake (Figure 9.16) most closely resemble Aroclor 1242 (Figure 9.13) – note the preponderance of lower chlorinated congeners. It is important to note that an exact pattern match between environmental samples and commercial products is very unlikely due to environmental weathering of the chemical signal, and that the best that can be expected is a general resemblance. One unexpected finding worth noting in the Canadice Lake core is that the congener pattern observed in the 4-6 cm section (Aroclor 1242) is different from both the fish flesh pattern observed during the past decade, or so, and from the pattern observed in the core segment immediately above (2-4 cm) which were considered consistent with higher chlorinated Aroclor compounds (Aroclor 1254 and/or 1260). The congener pattern in the Seneca Lake core segment (Figure 9.16) is somewhat more complex than that from the other two lake cores discussed above. The pattern would suggest the presence of two Aroclors – note the peaks on both the left and middle portions of the plot. The left-most pattern is again indicative of Aroclor 1242 (see Figure 9.13), historically the most widely used Aroclor product within the United States. The middle portion of the plot most closely resembles Aroclor 1254 (see Figure 9.13). For example, the largest peak in this portion of the plot (IUPAC-118) represents approximately 8 percent of the total congener mass of the sample while it represents approximately 7 percent of Aroclor 1254. Thus, the Seneca Lake findings indicate that PCB inputs to the lake may originate from more than one source.

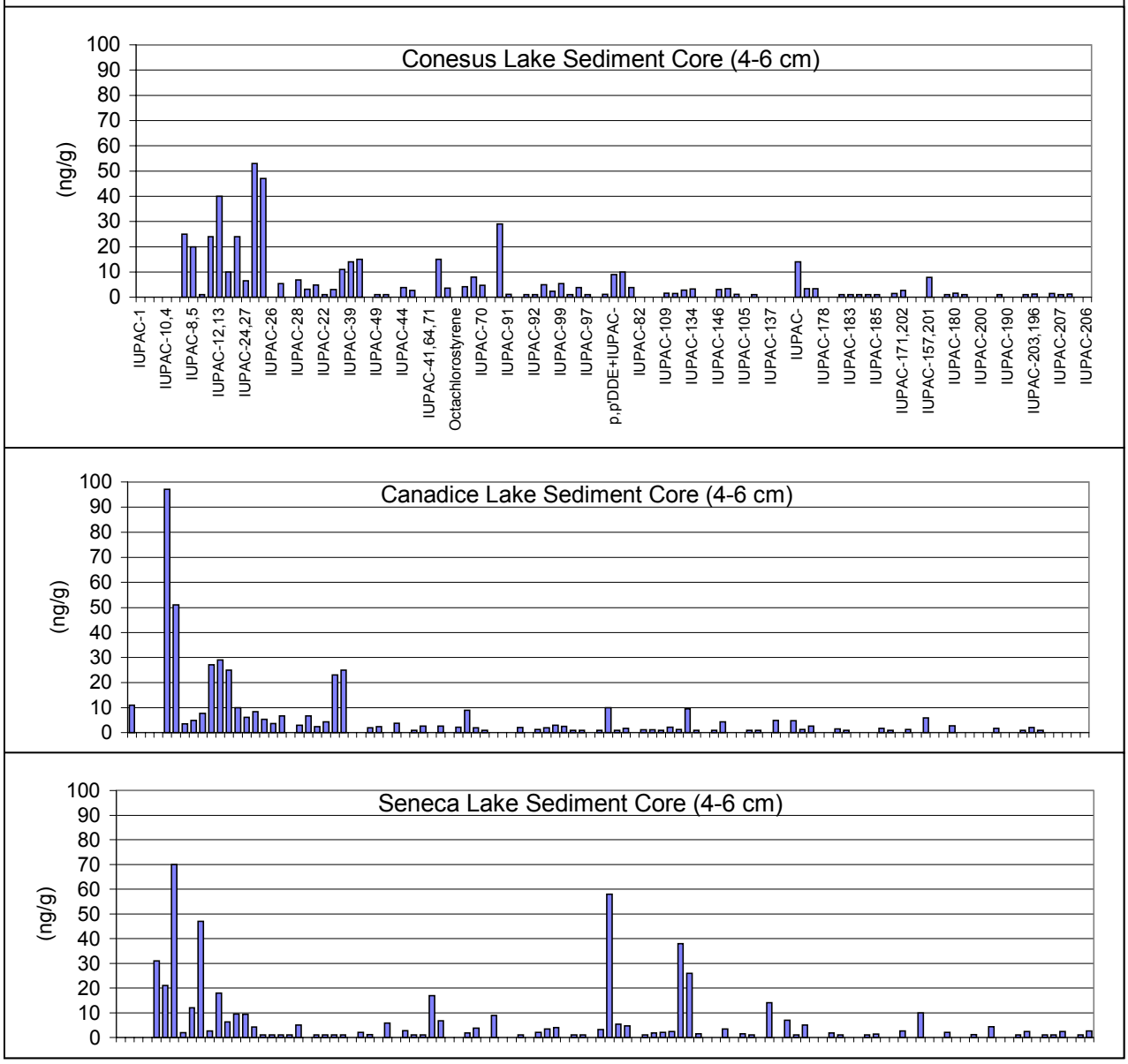
The lack of detectable Aroclors precludes evaluation of temporal PCB trends within the Finger Lakes. In retrospect, it would have been advisable to analyze several sediment core segments using the congener method.

With respect to sediment quality assessment values, the PCB congener totals indicate that all of the Finger Lakes, for which PCB congener data is available, exceed the TEL (34.1 ppb) for PCBs and that a number of the lakes (Skaneateles, Owasco, Seneca, Keuka, Canadice, and Conesus Lakes) exceed the PEL (270 ppb) for total PCBs. Furthermore, while no congener information was available for Canandaigua Lake, it is likely that it would also exceed the TEL and possibly the PEL, given the existing fish consumption advisory. The fact that the sediments in many of the Finger Lakes show elevated levels of PCBs is probably indicative of a diffuse source (e.g., atmospheric) of PCBs to the basins. However, the pattern differences observed in Seneca Lake may indicate some local influence. Furthermore, the relatively low productivity in many of these lakes probably contributes to the observed elevations in that concentrations are reported on a weight per weight basis.

Other Organic Chemicals

The only other organic contaminant found in any of the Finger Lakes cores was Dieldrin. Dieldrin, also an organochlorine pesticide, was historically used for termite control, corn pests, and control of moths (clothing and carpets). Dieldren was banned in the United States in 1974 except for termite control. Dieldrin was found in only a single sediment core segment taken from Canadice Lake. Judging from the level observed (6 ppb) and the depth of occurrence (6-8 cm, ~ 1963), it is likely that Dieldren is of little environmental concern within the Finger Lakes.

Figure 9.16: PCB congener pattern for selected Finger Lakes



d. Inorganic Chemical Findings

Inorganic substances analyzed during this investigation are shown in Table 8.3. In contrast to the organic substances discussed previously, the inorganic substances discussed below can originate from either natural or human processes and/or activities. A listing of the relative quantities (in parts per million) of certain of these elements in the earth's lithosphere (earth's crust) is presented in Table 9.7. Obviously, the concentration of these elements within the earth's crust varies spatially, however, these values provide some perspective regarding the relative abundance of these elements within nature.

Table 9.7: Concentration of selected elements in Earth's Lithosphere (Gammel, 1998)

Element	*Symbol*	*Atomic Number*	*Atomic Weight*	*Concentration (ppm)*	*Percentage*
Arsenic	As	33	74.92	1.5	1.5×10^{-4}
Cadmium	Cd	48	112.40	0.11	1.1×10^{-5}
Calcium	Ca	20	40.08	41,000	4.1
Chromium	Cr	24	52.00	100	1.0×10^{-2}
Copper	Cu	29	63.54	50	0.5×10^{-2}
Lead	Pb	82	207.2	14	1.4×10^{-3}
Manganese	Mn	25	54.94	950	9.5×10^{-2}
Mercury	Hg	80	200.6	0.05	5.0×10^{-6}
Nickel	Ni	28	58.71	80	8.0×10^{-3}
Zinc	Zn	30	65.37	75	7.5×10^{-3}

More than two dozen inorganic chemicals were investigated during this study. However, sediment quality assessment values are available for only a subset of them (see Table 9.8). The relevant assessment values for these compounds are listed in Table 9.8. As with the organic compounds discussed earlier, two assessment values (TEL and PEL) are presented. The reference values are taken from Smith, et al. (1996). These assessment values are believed to be appropriate for evaluating the chemical findings from the Finger Lakes sediment cores. Historical (deep sediment) levels of these chemicals from other parts of New York State are presented in Table 9.9.

Given the large number of analytes assessed during this investigation, the limited availability of assessment values, and space constraints, discussion of results is limited to: (a) those chemicals for which sediment quality assessment values are available; and (b) two additional chemicals (calcium and manganese) which provide additional insight regarding lake chemistry within the Finger Lakes.

Table 9.8: Inorganic sediment assessment values

Substance	TEL (ppm)	PEL (ppm)
Arsenic	5.9	17
Cadmium	0.6	3.53
Chromium	37.3	90
Copper	35.7	197
Lead	35	91.3
Mercury	0.17	0.49
Nickel	18	36
Zinc	123	315

TEL: threshold effect level (Smith, et al., 1996)
PEL: probable effect level (Smith, et al., 1996)

Table 9.9: Historical inorganic chemical levels in NY State sediments (Estabrooks, unpublished data)

Element/Information	NY Harbor (fine grained)	Oswego River (coarse grained)
Arsenic (ppm)	na	0.95
Cadmium (ppm)	0.5	0.6
Chromium (ppm)	60	3.8
Copper (ppm)	25	7.9
Lead (ppm)	20	1.7
Mercury (ppm)	0.3	0.09
Nickel (ppm)	35	3.7
Zinc (ppm)	80	8.8
Carbon (percent)	5	na
Est. Age (years)	500	300

Arsenic

Arsenic (As) is a naturally occurring element in the Earth's crust and is also generated by certain human activities (both current and historical). Arsenic can enter aquatic environments as a result of naturally induced weathering of arsenic containing rock formations. Anthropogenic activities which can result in the release of arsenic to the environment range from arsenic-based insecticides to the burning of fossil fuels – see box below for additional information.

Arsenic was detected in all 11 of the Finger Lakes sediment cores. However, arsenic concentratios varied markedly (more than 4 fold) between the lakes. Table 9.10 provides a summary of arsenic findings for each of the lakes – the table provides a listing of peak arsenic levels and associated sediment depths, as well as surficial sediment concentrations for each of the Finger Lakes. There was no discernable spatial pattern for arsenic levels within the Finger Lakes. The highest sediment arsenic concentrations were observed in surficial sediments from Keuka Lake and Canandaigua Lake. Somewhat lower arsenic levels were observed in surficial sediments from Skaneateles Lake and Canadice Lake. Hemlock Lake also showed substantial sediment arsenic concentrations, however, temporal patterns were not available due to poor radiometric profiles. Sediment core arsenic results for a number of the Finger Lakes are presented in Figures 9.19 and 9.20 - the figures show sediment core arsenic concentrations versus sediment depth.

Table 9.10: Arsenic summary for Finger Lakes sediment cores

Lake	*Peak Arsenic (ppm)*	*Surface Arsenic (ppm)*	*Comments*
Otisco	11 @ 3-4 cm	< 10	surface sediment below detection
Skaneateles	34 @ surface	34	
Owasco	14 @ 3-4 cm	10	
Cayuga	12.5 @ surface	12.5	no temporal significance due to disturbance
Seneca	19 @ surface	19	
Keuka	47.1 @ surface	47.1	highest peak and surface As levels
Canandaigua	45 @ surface	45	2nd highest peak and surface As levels
Honeoye	19.4 @ 6-9 cm	17.1	
Canadice	29.3 @ surface	29.3	
Hemlock	21.4 @ surface	21.4	no temporal significance due to disturbance
Conesus	20.2 @ 4-6 cm	16.9	
TEL	5.9		
PEL	17.0		

In general, temporal trends in sediment arsenic levels within the Finger Lakes indicate increasing concentrations over the past several decades. As shown in Table 9.5 above, 5 of the 9 Finger Lakes with intact sediment chronologies (Skaneateles, Seneca, Keuka, Canandaigua, and Canadice Lakes) show arsenic peaks within surficial sediment layers. Furthermore, 3 additional lakes (Otisco, Owasco, and Conesus Lakes) demonstrate higher arsenic levels in the upper half of the sediment cores. Similar trends in arsenic levels have been observed in Lake Champlain (Lassel, 1996). While the reason(s) for the upward trend in arsenic levels in upper sediment layers is not certain, there are several plausible hypotheses.

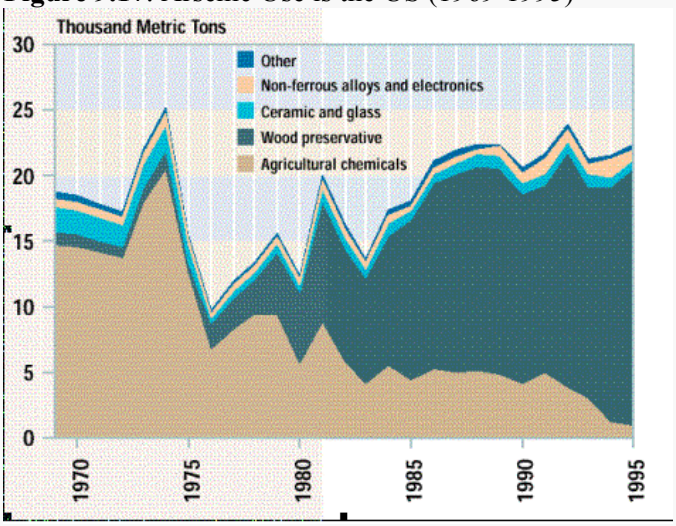
Arsenic

Arsenic (As) has been used as an insecticide for centuries. Some evidence suggests that the Chinese used arsenic as an insecticide as early as 200 BC (US Army, 2000). More recent use figures for the United States are included in Figure 9.17. In general, prior to 1975, agricultural use was the predominant anthropogenic source of arsenic to the environment, however, from 1975 to the present agricultural use of arsenic has declined while wood preservative applications have increased markedly. Arsenic compounds used in wood preservation include chromated copper arsenate (CCA) and ammoniacal copper arsenate (ACA). The burning of fossil fuel is also a significant source of arsenic to the environment. Arsenic may also reach aquatic systems via natural processes such as the dissolution of mineral and/or rock deposits containing arsenic.

Arsenic is a naturally-occurring mineral, and is considered a transitional metal, or metaloid, with respect to its position in the Periodic Table. This suggests that arsenic can behave as either a metal or a non-metal. The primary arsenic species found in natural waters are arsenate ions (oxidation state +V) which are most prevalent in aerobic waters and arsenite ions (oxidation state +III) which are most common in anaerobic waters. The two species show significantly different chemical behavior. One particularly important difference is that arsenate behaves similar to phosphate in aquatic systems, which can have significant implications for biotic uptake and availability. Arsenic can occur in both inorganic and organic forms. The principal forms of arsenic and their cycling through the aquatic environment are depicted in Figure 9.18. Arsenic toxicity varies, in general the trivalent (+III) compounds are considered more toxic than the pentavalent (+V) compounds.

As with DDT, arsenic is featured prominently in Rachel Carson's Silent Spring (Carson, 1962). Arsenic exhibits both acute toxicity (neuro-toxin) and chronic toxicity (carcinogenicity). Arsenic has long been known to be a neurotoxin. This is the principal mechanism by which arsenic acts as a pesticide. With respect to chronic toxicity, arsenic has been linked to cancers of the skin, liver, bladder and lung. The United States Environmental Protection Agency (EPA) is currently in the process of evaluating the maximum contaminant level (MCL) for arsenic in drinking water supplies. EPA is reviewing the MCL for arsenic because of concerns that it may not be sufficiently protective of human health. The proposed MCL is 10 ug/l, which would be a 5-fold reduction from the existing MCL of 50 ug/l.

Figure 9.17: Arsenic Use is the US (1969-1995)



Source: Interagency Working Group on Industrial Ecology, 1998

Figure 9.18: Arsenic Cycle (from Sohrin, 1997)

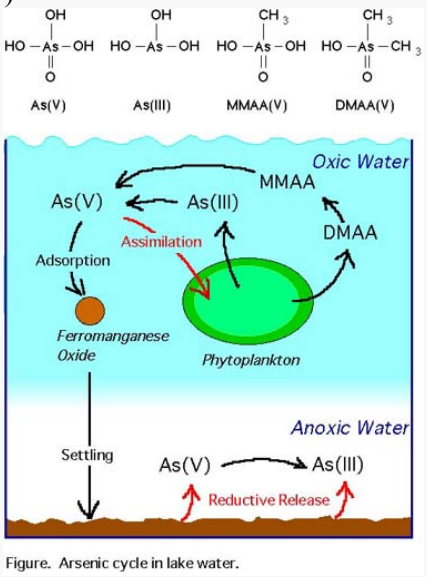
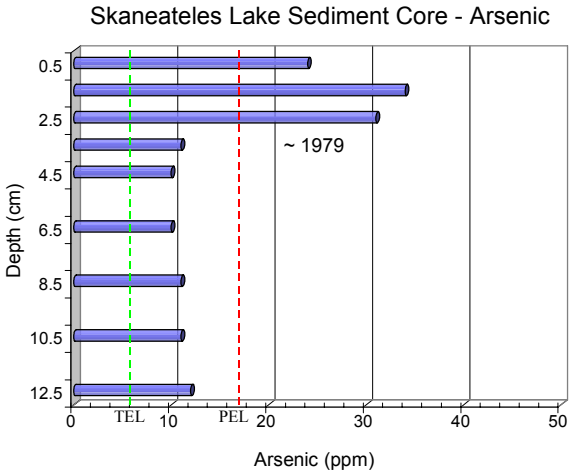
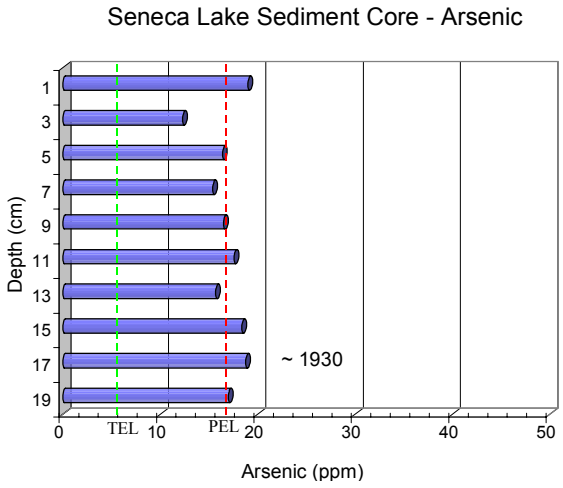
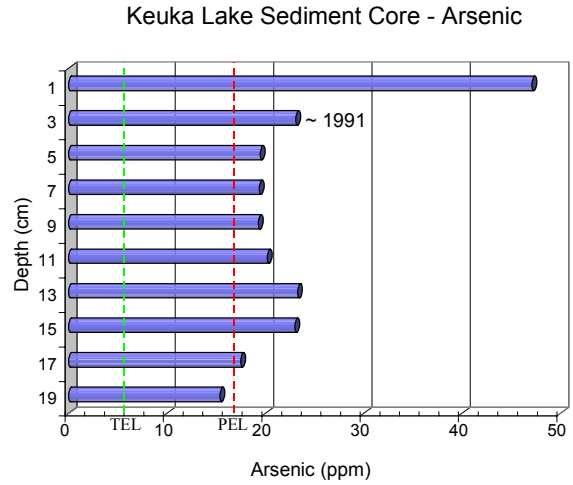


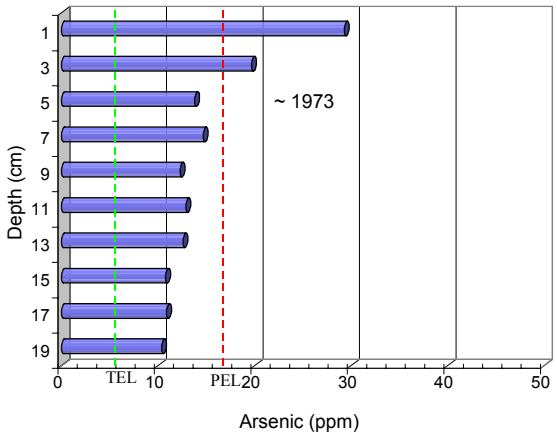
Figure. Arsenic cycle in lake water.

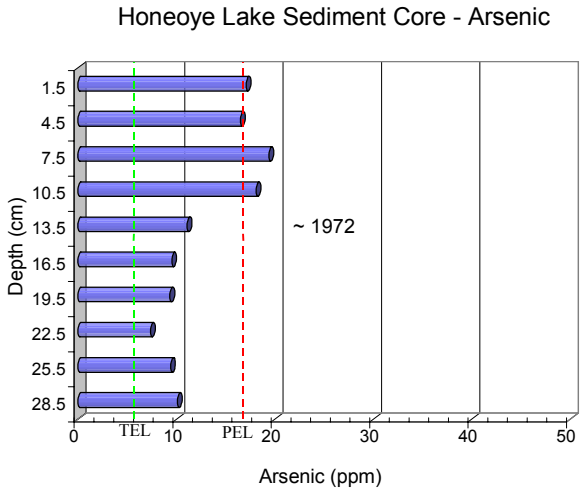
Figure 9.19: Sediment core arsenic profiles for selected Finger Lakes











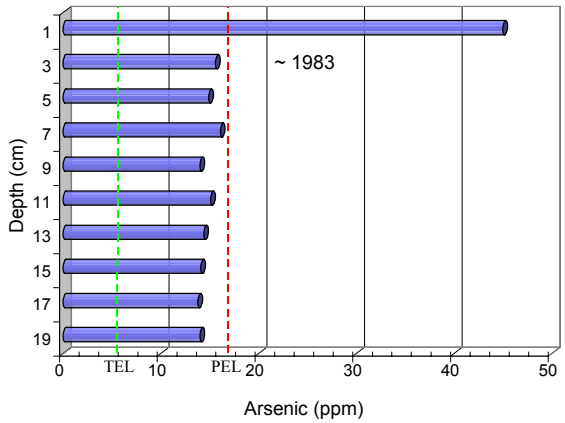
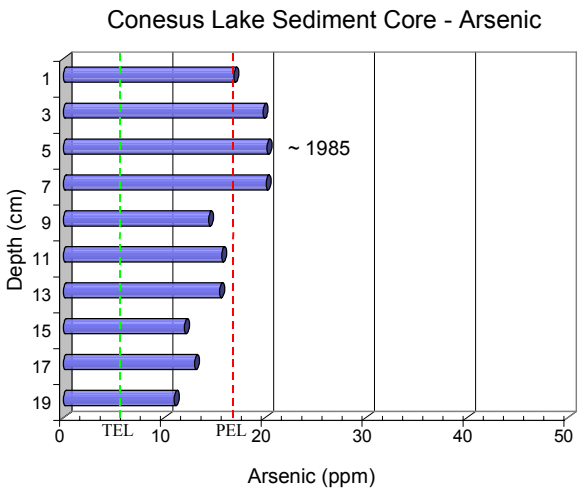


Figure 9.20: Conesus sediment core arsenic profile



First, it is conceivable that the increase in arsenic concentration in the upper sediments of these lakes is the result of decreased primary productivity within these systems. Arsenic concentrations within the sediments are recorded on a weight per weight basis (ug/kg). If one assumes a constant input of arsenic to a lake, then, as the mass of other material being contributed to the bottom sediments is reduced (due to decreased algal productivity, etc.), the concentration of arsenic within the sediments, on a weight per weight basis, would tend to increase. Thus, one would expect an inverse relationship between sediment arsenic concentration and primary productivity for a given lake. There are several lines of evidence that lend support to this hypothesis. For instance, the increases in arsenic levels coincide temporally, to a degree, with reductions in lake trophic indicators. The arsenic increases appear within the past 2-3 decades and are thus consistent (temporally) with reductions in phosphorus loadings as discussed earlier. Furthermore, those lakes (Otisco, Honeoye, and Conesus Lakes) that have shown little or no reduction in trophic conditions, also exhibit less pronounced increases in arsenic levels, or no recent spike in arsenic levels. Furthermore, the magnitude of change in both sediment arsenic concentration (~ 2-3 fold increase) and primary productivity (~ 2-3 fold decrease as measured by chlorophyll *a*) are approximately equivalent in those lakes exhibiting arsenic enrichment. One line of evidence that would appear to work against such a hypothesis is that one would expect other compounds (with a constant rate of supply over time) to mimic the arsenic patterns. The only inorganic chemical to show a similar chronological pattern as arsenic is manganese, and this parallel might have an alternative explanation – see below.

S*econd*, it is possible that there is an upward migration of arsenic within the sediments due to reduction/oxidation conditions within the benthos. The solubility of arsenic in water is influenced by dissolved oxygen levels – in general, as dissolved oxygen levels increase arsenic solubility decreases, and visa versa. A similar relationship exists for several other elements (e.g., phosphorus, manganese, etc.). Thus, in well-oxygenated lakes, the upper sediment layer of the benthos remains oxygenated, thereby restricting the solubility of arsenic in the pore waters of these sediments. In contrast, lower sediment layers, being largely devoid of oxygen (due to oxygen consumption and lack of replenishment), show increased arsenic solubility in pore waters. This disparity in pore water solubility would theoretically establish a vertical *concentration gradient* within the benthic sediments - with lower pore water arsenic concentrations within surface sediments and higher pore water arsenic concentrations within the deeper sediments – resulting in an upward migration of arsenic within the sediments. However, once the arsenic reaches the surficial sediment layer (which remains oxygenated in many of the study lakes) it precipitates out of solution and is incorporated within the benthic sediments. There are several lines of support for this hypothesis. First, other researchers have observed a similar upward migration for manganese within the bottom sediments of aquatic systems (Williams, et al., 1978), and, as will be discussed below, manganese was found to show very similar patterns to arsenic within the Finger Lakes. In addition, USGS research conducted on Cayuga Lake cores found differences in pore water arsenic concentrations with depth – with maximum pore water arsenic concentrations at between 35-50 cm depth (Kraemer, unpublished data).

Third, it is the possible that arsenic loading to the Finger Lakes has increased over the past several decades due to either anthropogenic activities or natural processes. For example, it is conceivable that acid rain within the watersheds may be accelerating the leaching of arsenic from underlying rock strata. Alternatively, either current arsenic use or historical (buried) sources may be contributing to arsenic loading within the watersheds.

Fourth, in some of the lakes, observed arsenic increases coincide temporally with the invasion of Zebra mussels. It is conceivable that Zebra mussel populations are altering the processing of arsenic within the lake ecosystem. As alluded to earlier, Zebra mussels are extremely efficient at scavenging particulate material from the water column. In effect, Zebra mussels behave like filters within a water body, and short circuit the normal processing of particulate material.

Regardless of cause(s), the arsenic spikes at the top of these sediment cores raise several environmental concerns. The arsenic levels observed within the sediments of certain Finger Lakes cores exceed current sediment quality assessment values. The surficial sediments from Canadice, Canandaigua, Keuka, Seneca, and Skaneateles Lakes exceed the PEL (17 ppm), while the surficial sediments from most of the other Finger Lakes exceed the TEL (5.9 ppm). The presence of arsenic in surficial sediments raises the following concerns: (a) possible availability of arsenic to the overlying water column through diffusion; and (b) availability of arsenic to the benthic biotic community. As discussed in the box above, there is currently a heightened concern about arsenic toxicity, and the USEPA is currently in the process of revising the MCL for arsenic.

Given these findings, and the fact that 10 of the 11 Finger Lakes serve as public water supply sources, water column sampling for arsenic was initiated in 1999 as part of the Synoptic Investigation. Findings were generally encouraging - only one sample showed detectable levels of arsenic (Owasco Lake epilimnetic sample from September 1999 at 10 ug/l). However, several caveats are in order regarding these findings: (a) analytical detection limits for the water samples were 10 ug/l, which is at the currently proposed MCL; (b) sampling was conducted at our prescribed sampling locations which included both epilimnetic and hypolimnetic samples, however, the hypolimnetic sample depth is, by definition, 2/3rds the station depth – thus, it is conceivable that arsenic concentrations could be higher nearer the lake bottom due to diffusion from the benthos; and (3) sample collection was quite limited (spatially and temporally) due to resource limitations.

Cadmium

Cadmium is found in relatively low concentrations in the earth's crust. Anthropogenic sources of cadmium include metal-plating operations, battery manufacture, pigment production, and plastics manufacturing. It can also be found in fairly high concentrations in sewage sludge. Cadmium is considered a potential human carcinogen, and has also been shown to cause other adverse health effects including kidney damage, bone defects, high blood pressure, and reproductive problems.

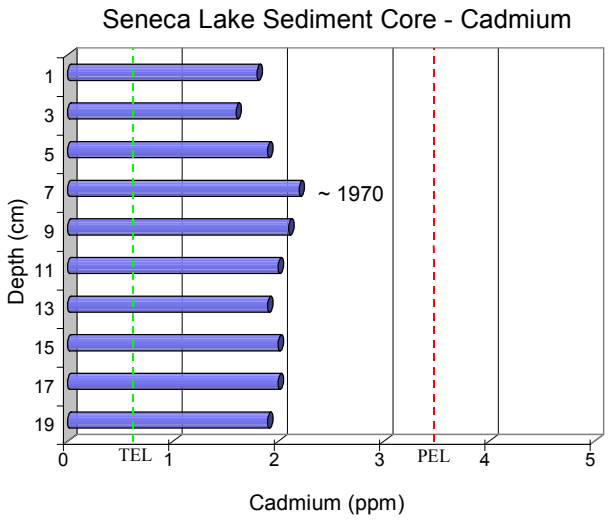
Detectable levels of cadmium were found in Conesus, Canadice, Seneca, and Cayuga Lakes (see Table 9.11). Cadmium levels in these cores ranged from below detection to 3.43 ppm. The highest observed cadmium concentration (3.43 ppm) was from Conesus Lake in the 2-4 cm core segment. Other core segments from Conesus Lake were below detectable levels. Unfortunately, analytical detection levels for core samples collected from the 3 eastern lakes (Otisco, Skaneateles, and Owasco Lakes) were relatively high (in certain instances above the PEL) and all samples came back as below detection. Thus, conclusions regarding cadmium levels for these lakes, or comparisons including these lakes, are not appropriate.

Table 9.11: Cadmium in Finger Lakes sediment cores

Lake	*Peak Cd (ppm)*	*Depth(cm)/Age*
Otisco	below detection	na
Skaneateles	below detection	na
Owasco	below detection	na
Cayuga	0.8	na
Seneca	2.2	6-8 cm (1970)
Keuka	below detection	na
Canandaigua	below detection	na
Honeoye	na	na
Canadice	1.4	6-8 cm (1963)
Hemlock	below detection	na
Conesus	3.4	2-4 cm (1990)
TEL	0.6	na
PEL	3.53	na

Due to the large number of analytical non-detects, temporal trends in cadmium levels are only discernable from the Seneca Lake core. The vertical profile for cadmium in the Seneca Lake sediment core is depicted in Figure 9.21. The trend indicates a slight decline in cadmium levels over time, beginning with a cadmium peak in approximately 1970.

Figure 9.21: Seneca Lake sediment core cadmium profile



Certain sediment core segments from each of the 4 lakes in which cadmium was detected (Cayuga, Seneca, Canadice, and Conesus Lakes) were above the TEL (0.6 ppm), but all were below the PEL (3.53 ppm) with the exception of a single core segment from Conesus Lake.

These findings appear to indicate that cadmium is not a significant environmental concern within the Finger Lakes. Furthermore, the relatively uniform cadmium concentrations observed within the Finger Lakes sediments, would suggest that the source of cadmium to these lakes is diffuse in nature (e.g., atmospheric deposition).

Calcium

Calcium (Ca) is relatively abundant in the earth's crust, and is generally not considered a toxic contaminant. The reasons for including calcium in this discussion are as follows: (1) temporal changes observed during this study may be indicative of ecosystem changes occurring within the Finger Lakes; and (2) findings indicate the potential to exacerbate problems associated with Zebra mussel populations.

The sediment core findings are largely consistent with water column findings presented above, in that sediment calcium levels exhibit significant spatial differences between lakes (see Table 9.12). Sediment calcium peak values varied by nearly an order of magnitude, with a minimum in Canadice Lake and a maximum in Otisco Lake. As with water column findings for major ion species, there is an apparent east/west trend in the calcium levels within the Finger Lakes, probably reflecting watershed soil conditions and underlying geology. In general, calcium levels are higher in the eastern Finger Lakes than in the western lakes. The lake sediments can be grouped into low (< 10,000 ppm), medium (> 10,000 ppm but < 50,000 ppm), and high (> 50,000 ppm) calcium levels based upon maximum calcium levels observed. Otisco and Owasco Lakes fall into the high calcium category, Skaneateles, Cayuga, Seneca, Canandaigua, and Conesus Lakes fit within the medium calcium category, and the remainder of the lakes (Keuka, Honeoye, Canadice, and Hemlock Lakes) fall into the low calcium category. These finding are consistent with water column findings presented above (See Figure 5.19).

Table 9.12: Calcium levels in Finger Lakes sediment cores

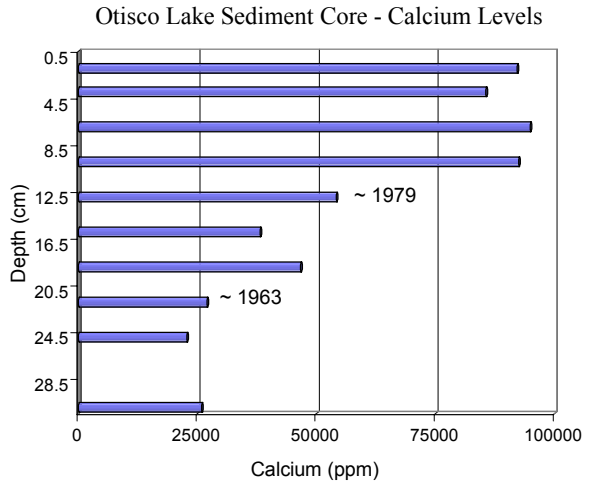
Lake	*Peak Ca (ppm)*	*Depth (cm)/~ Age*
Otisco	94,900	6-7 (1987)
Skaneateles	25,400	1-2 (1989)
Owasco	90,200	3-4 (1987)
* Cayuga	46,100	na
Seneca	37,200	4-6 (1978)
Keuka	3,680	0-2 (1996)
Canandaigua	18,900	14-16 (1923)
Honeoye	4,550	0-3 (1996)
Canadice	2,540	2-4 (1983)
* Hemlock	3,470	na
Conesus	25,800	2-4 (1990)

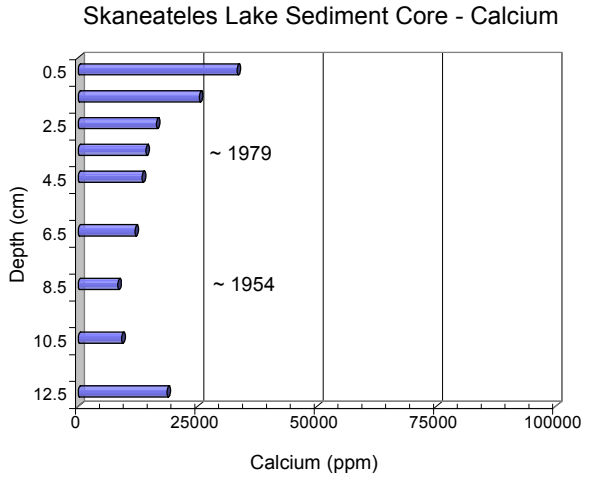
* Cayuga Lake and Hemlock Lake cores showed disturbed sediment chronologies.

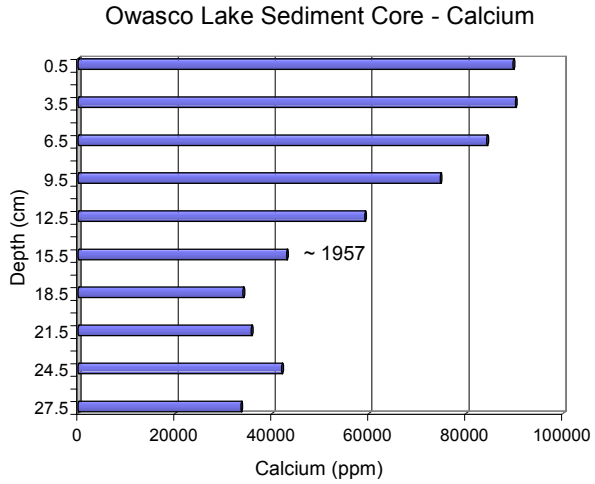
The sediment cores offer some intriguing temporal insights with respect to changes in calcium levels within the Finger Lakes. Sediment core findings for nearly every one of the Finger Lakes (in which intact chronologies were available) show a significant increase in calcium levels over the past half-century. These findings are illustrated in Figure 9.22. Our results suggest significant increases in calcium levels beginning between the mid-1950s to the late-1970s, with peak concentrations occurring within the last two decades. However, our analyses were generally limited to the upper 30 cm of the sediment cores. Researchers from Syracuse University, which participated in this investigation, analyzed calcite concentrations from deeper portions of the cores. Their results indicate that calcite concentrations began to increase in the 1920s and 1930s (Mullins, et al., 2000). Their working hypothesis is that the calcium increases observed over the past half-century or more may be due to the effects of acid rain. It is hypothesized that acid rain accelerates the leaching of minerals (e.g., calcium) within the watershed, and the minerals are then transported to the lake basin. This hypothesis is consistent with other researchers (Lawrence, et al., 1997) who have documented accelerated calcium depletion rates from forest soils.

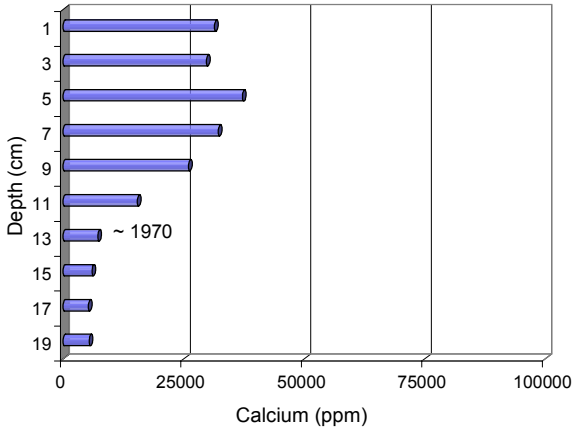
The implications of the observed calcium changes are not yet clear. However, as discussed earlier, increasing calcium levels within the lake water column could lead to an increase in Zebra mussel populations, which could in turn exacerbate problems associated with these exotic invaders. It is also possible that accelerated leaching of calcium (and other cations) from watershed soils might eventually lead to diminished buffering capacity within certain Finger Lakes (e.g., Canadice Lake). Effects might also extend beyond the lake itself. There are some indications in other areas of the world that acid rain has adversely affected certain forest ecosystems and degraded forest productivity.

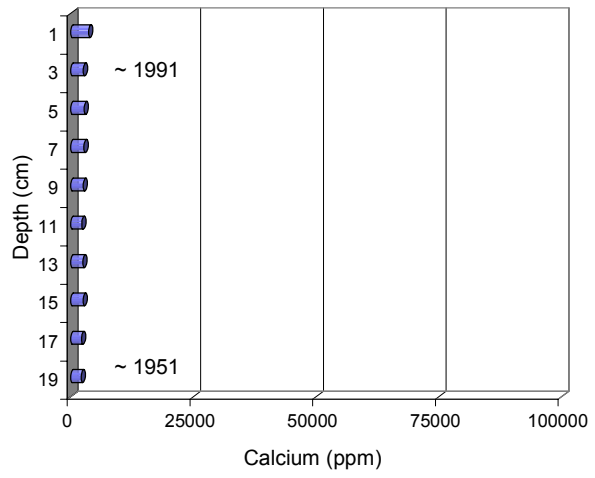
Figure 9.22: Calcium profiles for selected Finger Lakes (notice scale differences for Depth)

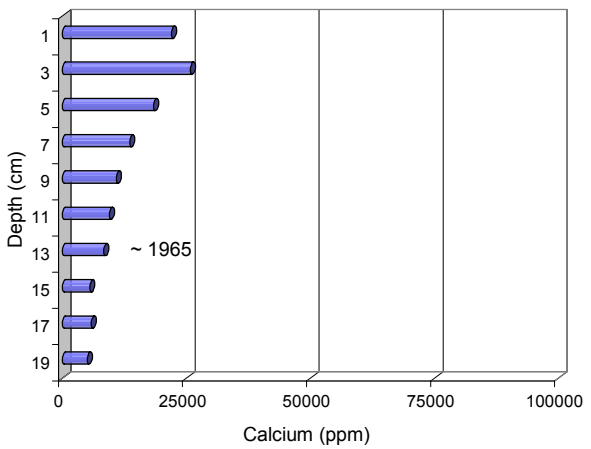












Chromium

Chromium (Cr) is found at relatively low levels within the earth's crust. Anthropogenic sources of chromium include chrome plating, the manufacture of pigments, leather tanning, and treatment of wood products (recall the discussion of arsenic and the use of CCA). Chromium occurs in the environment in three principal states –chromium (0), chromium (III), and chromium (VI). Chromium (III) occurs naturally in the environment, while chromium (VI) and chromium (0) result primarily from industrial processes. Chromium toxicity varies significantly depending upon the species present. Chromium (III) is the least toxic of the three species, and is actually considered an essential nutrient.

Sediment core findings indicate moderate levels of chromium within the Finger Lakes – see Table 9.13. Results are for total chromium levels and do not differentiate between chromium species. The results suggest some spatial patterns across the lakes. The three eastern lakes exhibit the highest chromium levels. However, it should be noted that analyses for the three eastern lakes sediment cores were conducted at a different laboratory than were the western lake cores. Unfortunately, sample collection for the two sets of lakes occurred in different years and no sample splits were conducted.

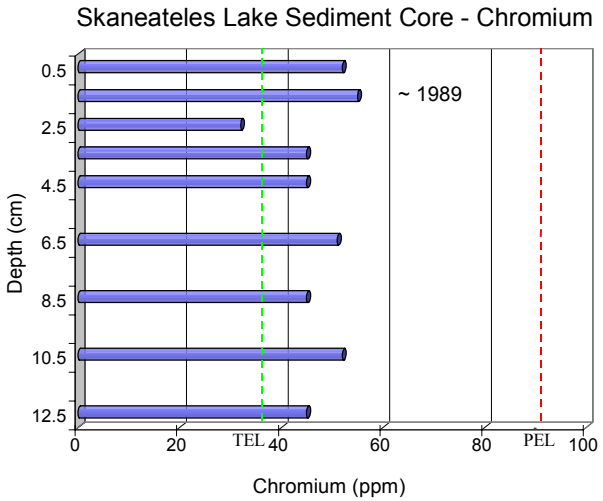
Table 9.13: Chromium in Finger Lakes sediment cores

Lake	*Peak Cr (ppm)*	*Depth (cm)/~ Age*
Otisco	58	25-26 (1962)
Skaneateles	55	1-2 (1989)
Owasco	52	12-13 (1964)
* Cayuga	18.3	na
Seneca	30.1	6-8 (1970)
Keuka	30.2	14-16 (1961)
Canandaigua	27.6	16-18 (1913)
Honeoye	32.5	0-3 (1996)
Canadice	28.6	2-4 (1983)
* Hemlock	30.5	na
Conesus	29.3	16-18 (1955)
TEL	37.3	na
PEL	90	na

* Cayuga Lake and Hemlock Lake cores show disturbed sediment chronologies.

Temporal trends in chromium levels, as interpreted through sediment core profiles, suggest that chromium levels within the Finger Lakes generally peaked between the 1950s and the 1970s. Exceptions to this general trend are Canandaigua Lake (peak about 1913), Skaneateles Lake (peak about 1989) and Honeoye Lake (peak about 1996). In the latter two instances, while the peaks occurred relatively recently, the data do not show a consistent trend. This can be seen in the chromium profile for Skaneateles Lake (see Figure 9.23). While chromium levels peaked in 1989, the level was only slightly higher than in some earlier years.

Figure 9.23: Skaneateles Lake sediment chromium profile



Chromium levels observed in certain Finger Lakes sediment cores segments (primarily, the three eastern lakes) exceed the TEL for chromium. However, none of the core segments exceeded the PEL for chromium.

The significance of the chromium finding is not clear. In general, the results would suggest diffuse loading of chromium to the Finger Lakes, as evidenced by the relatively uniform levels of chromium observed.

Copper

Copper (Cu) is found at relatively low levels within the earth's crust. However, copper is used widely in human activities. This is due to the fact that copper offers a number of attractive industrial properties (e.g., corrosion resistance, malleability, and conductivity). Copper is used extensively in the electrical, plumbing, and automotive industries. Copper, in the form of copper sulfate, has been used historically to control the growth of algae in aquatic systems. Copper is toxic to many freshwater invertebrates and fish. Copper toxicity is influenced by several factors, including water hardness, pH, and the level of organic matter present.

Sediment core findings indicate fairly uniform levels of copper within the Finger Lakes with the exception of Otisco Lake (see Table 9.14). Seven of the Finger Lakes (Owasco, Keuka, Canandaigua, Honeoye, Canadice, Hemlock, and Conesus Lakes) show remarkably similar peak copper levels. Skaneateles and Seneca Lakes show somewhat higher peaks with respect to sediment copper levels. However, Otisco Lake sediments exhibit far higher copper levels than the other Finger Lakes. The copper profile for Otisco Lake is shown in Figure 9.24. The elevations in copper levels are likely the result of copper sulfate treatments for the control algal growth, which have taken place on Otisco Lake for many years. In fact, if one looks at the lower sediments (~ 1955 back) the copper levels are quite consistent with the historical levels observed in most of the other Finger Lakes.

Table 9.14: Copper levels in Finger Lakes sediment cores

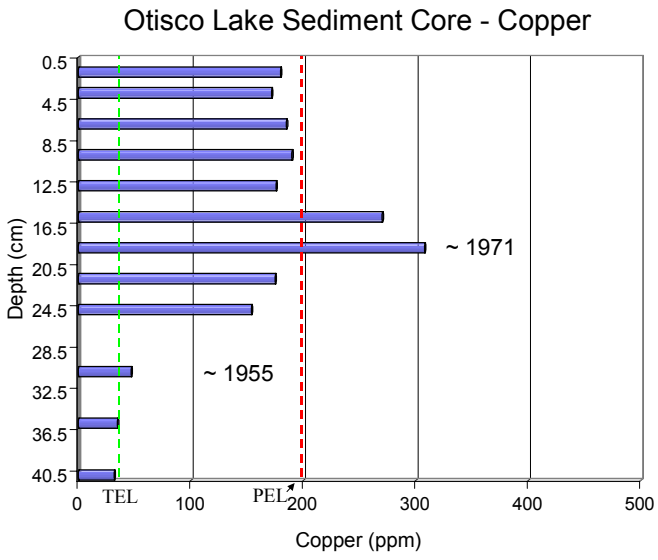
Lake	*Peak Cu (ppm)*	*Depth (cm)/~ Age*
Otisco	308	18-19 (1971)
Skaneateles	78	8-9 (1954)
Owasco	44	0-1 (1995)
* Cayuga	31.4	na
Seneca	61.8	6-8 (1970)
Keuka	45.1	4-6 (1986)
Canandaigua	42.2	2-4 (1983)
Honeoye	44.8	24-27 (1948)
Canadice	45.9	2-4 (1983)
* Hemlock	49.8	na
Conesus	44	10-12 (1970)
TEL	35.7	na
PEL	197	na

* Cayuga Lake and Hemlock Lake cores showed disturbed sediment chronologies.

The temporal trends in copper, as captured in sediment core profiles, are sporadic for most of the Finger Lakes. The only exception to this pattern is Otisco Lake. Otisco Lake shows a marked increase in sediment copper levels in the late 1950s, and a peak in copper levels during the early 1970s. The levels decline somewhat thereafter, but plateau at about four times background levels. Once again, these temporal trends in sediment copper concentrations likely reflect copper sulfate treatments within Otisco Lake.

Most of the Finger Lakes exceed the TEL for copper. Otisco Lake was the only one of the lakes to exceed the PEL for copper, and that was several decades ago.

Figure 9.24: Otisco Lake sediment core copper profile



Lead

Lead (Pb) is relatively rare in the earth's crust. However, lead has been used in human activities for thousands of years. In fact, some theorize that lead poisoning played a role in the demise of the Roman Empire - due to leaching of lead from Roman aqueducts. Lead offers a number of attractive properties for industrial applications including, softness, high density, low melting point, and corrosion resistance.

While lead can reach aqueous environments from natural processes (e.g., erosion of rock, forest fires, etc.), elevated levels are most often associated with human activities. Anthropogenic sources of lead range from lead-based house paint to industrial mining operations. Other sources of lead contamination include lead-based pipes and solder, lead-acid batteries, and lead-based sinkers and shot. However, the most pervasive source of lead to the environment during the past century has been leaded gasoline. Lead was first used as a gasoline additive during the 1920s. The additives tetraethyl and tetramethyl lead were used to prevent engine knock, enhance octane levels, and lubricate engine valves. By the late 1960s and early 1970s, it was apparent that lead had become a widespread contaminant in the environment, and efforts were begun to address the situation. Lead exposure can cause damage to the brain, nervous system, red blood cells, and the kidneys. By the mid 1980s, regulations were in place that curtailed the use of leaded gasoline. As a comparison, in 1979 automobiles released 94.6 million kilograms of lead into the air in the United States, while by 1989 that number had declined to 2.2 million kg – over a 40 fold reduction (USPHS, 1993).

Comparisons of sediment lead levels within the Finger Lakes indicate some spatial differences between lakes (see Table 9.15). Peak lead levels, for those lakes in which intact sediment chronologies were available, ranged from 55 mg/kg in Otisco Lake to 108 mg/kg in Conesus Lake. The highest lead levels observed occurred in Conesus and Skaneateles Lakes, which represent the productivity extremes within the Finger Lakes. In both instances, peak levels occurred approximately 3-4 decades ago. The lowest lead levels observed overall were in the Cayuga Lake sediment core. Recall, however, that the Cayuga Lake core was not considered appropriate for dating purposes due to its poor cesium profile. Thus, the peak lead level in Cayuga Lake should be viewed as a composite value. Furthermore, there are indications that lead may be a concern in the southern end of Cayuga Lake. For example, there is an ongoing investigation of a contamination site in Ithaca, adjacent to Fall Creek, which is believed to contain significant levels of lead. Furthermore, sediment investigations within the southern end of Cayuga Lake showed elevated lead levels (123 ppm) on the east side of the lake (Sterns and Wheler, 1997).

Table 9.15: Lead in Finger Lakes sediment cores

Lake	*Peak Pb (mg/kg)*	*Depth (cm)/~ Age*
Otisco	55	24-25 (1963)
Skaneateles	102	6-7 (1964)
Owasco	73	12-13 (1965)
* Cayuga	26.3	na
Seneca	84.6	6-8 (1970)
Keuka	69.4	12-14 (1966)
Canandaigua	78	6-8 (1963)
Honeoye	62.9	12-15 (1972)
Canadice	64.2	4-6 (1973)
* Hemlock	52.5	na
Conesus	108	10-12 (1970)
TEL	35	-
PEL	91.3	-

* Cayuga Lake and Hemlock Lake cores showed disturbed sediment chronologies.

Sediment core lead profiles for a number of the Finger Lakes are shown in Figures 9.25 and 9.26.

Figure 9.25: Lead profiles in sediment cores from selected Finger Lakes - 1 (note scale differences)

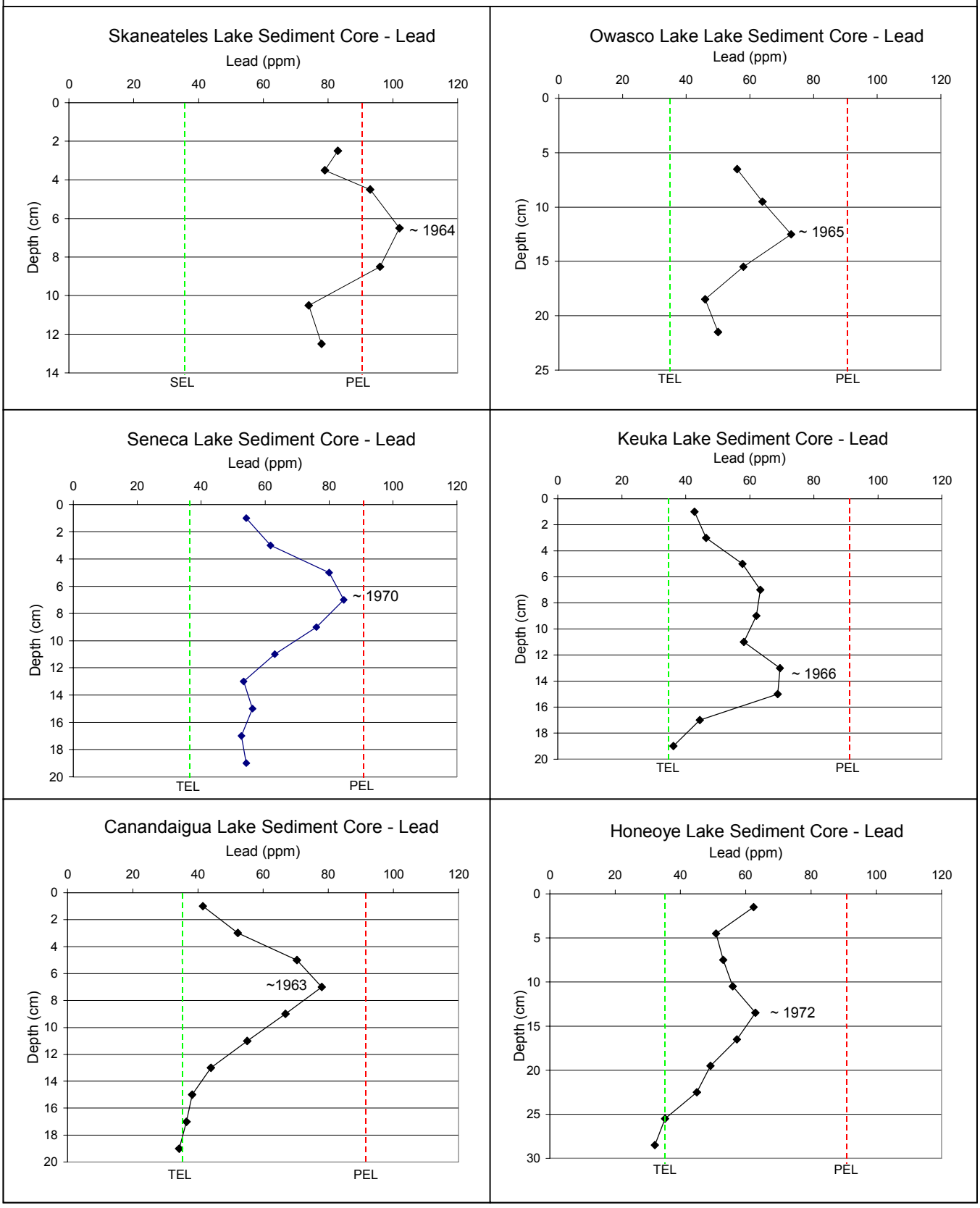
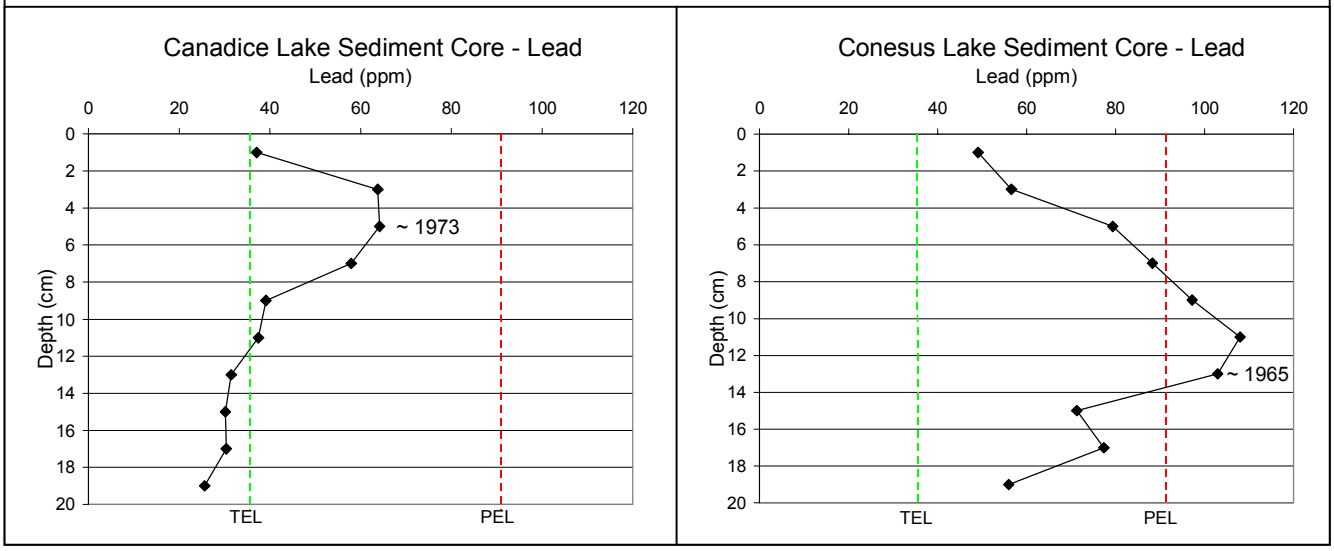


Figure 9.26: Lead profiles in sediment cores from selected Finger Lakes - 2



Temporal trends for lead within the Finger Lakes sediment cores indicate a predominantly downward trend. Findings from all of the lakes, in which intact sediment cores were obtained, indicate that maximum lead levels occurred between the mid-1960s and the mid-1970s. Furthermore, with the exception of Honeoye Lake, all of the lakes exhibit a pronounced decline in lead levels over the past 3-4 decades. It is interesting to note the rather narrow range in peak lead levels observed (~ 70-110 mg/kg), which would appear to support the notion of a widespread loading source (e.g., leaded gasoline). This is also consistent with the phasing-out of leaded gasoline within the United States during the past several decades. As noted above, the only exception to the downward trend in lead levels is Honeoye Lake. While Honeoye Lake does show a significant decline in lead levels between the mid-1970s and the late 1980s, there is a recent up-tick in lead levels (as shown in the most recent core segment). The lead level observed in the most recent core segment is close to the peak value observed in the early 1970s. The cause and/or validity of this recent upturn in lead levels within Honeoye Lake are not certain.

While lead levels have declined markedly within the Finger Lakes over the past several decades they remain, for the most part, above the TEL. However, none of the Finger Lakes surficial core segments exceed the PEL for lead – although deeper sediments within Conesus and Skaneateles Lakes do exceed the PEL.

It is unclear from our findings whether lead levels will continue to decline or whether they have reached a plateau. The question of "background" lead concentrations within the Finger Lakes is not entirely answerable. For example, note that observed "background" levels (background is in quotations because it is unclear if the deepest core segments represent true background conditions) range from approximately 30 ppm on Canadice Lake (ca. 1903) to approximately 80 ppm on Skaneateles Lake (ca. 1934). Obviously, the Canadice Lake core segment is from an earlier date than is the Skaneateles Lake core segment. Thus, the lead levels observed within the deep sediments of Canadice Lake are probably a better representation of actual background concentrations within the Finger Lakes, given their earlier vintage and lower concentration. This may indicate that lead levels within several of the Finger Lakes remain elevated above historical background levels.

Manganese

Manganese (Mn) is moderately abundant in the earth's crust. It is used in the production of steel, batteries, and ceramics. In addition, manganese, in the form of methylcyclopentadienyl manganese tricarbonyl (MMT), is used to enhance octane levels in gasoline. MMT is one of the substances used to replace lead compounds in gasoline. Manganese is an essential nutrient, however, it can have toxic effects at elevated concentrations. It can have adverse effects on the nervous system, lung, and reproductive system.

The Finger Lakes sediment cores collected for this study show substantial spatial variation in manganese levels (see Table 9.16). Peak levels vary by nearly 5 fold, ranging from 1,800 ppm in Canadice Lake to 8,810 ppm in Skaneateles Lake – this excludes Cayuga and Hemlock Lakes due to disturbed sediment chronologies discussed above. There was no apparent east-west trend in the data, nor were manganese levels significantly correlated to lake size or lake productivity level.

Table 9.16: Manganese in Finger Lakes sediment cores

Lake	*Peak Mn (ppm)*	*Depth (cm)/~ Age*
Otisco	1710	9-10 (1983)
Skaneateles	8810	0-1 (1994)
Owasco	3630	0-1 (1995)
* Cayuga	940	na
Seneca	2450	0-2 (1994)
Keuka	5650	0-2 (1996)
Canandaigua	4960	0-2 (1993)
Honeoye	2410	0-3 (1996)
Canadice	1800	0-2 (1993)
* Hemlock	2550	na
Conesus	3490	10-12 (1970)
TEL (LEL)	na	-
SEL	na	-

* Cayuga Lake and Hemlock Lake cores showed disturbed sediment chronologies.

Temporal trends indicate a significant increase in sediment manganese levels within many of the Finger Lakes over the recent past. Sediment core profiles for manganese are shown in Figures 9.27 and 9.28. With the exception of Conesus Lake, peak manganese levels in each of the Finger Lakes sediment cores are found in the surficial sediment layer. This pattern is quite similar to the arsenic findings discussed above.

At the present time there are no established sediment quality assessment values for manganese in benthic sediments.

Figure 9.27: Manganese profiles in sediment cores from Skaneateles and Owasco Lakes.

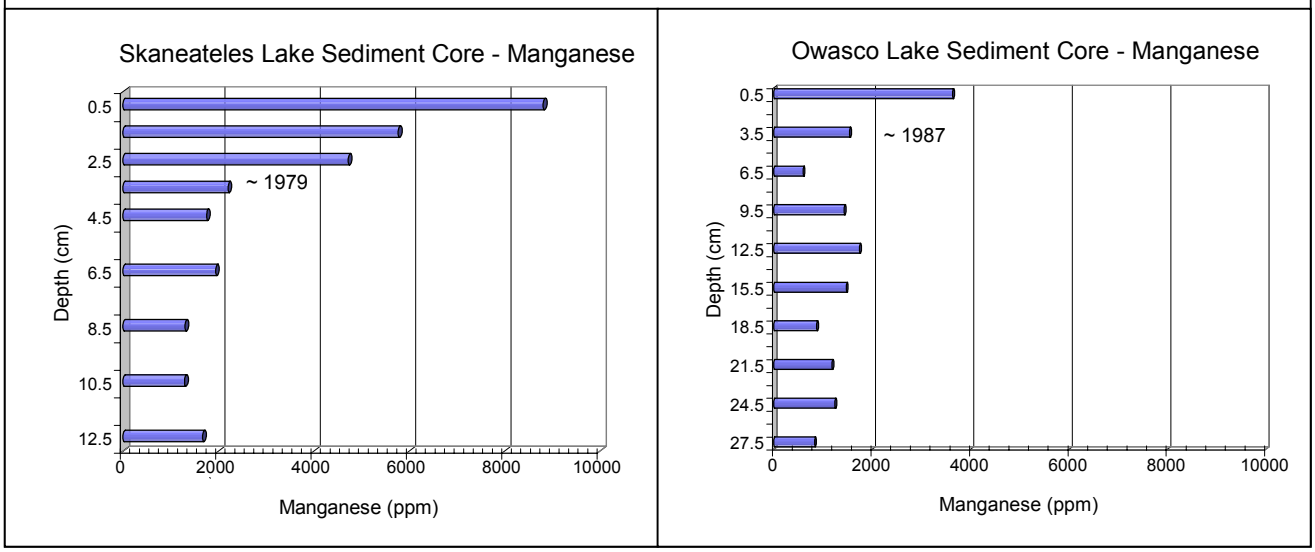
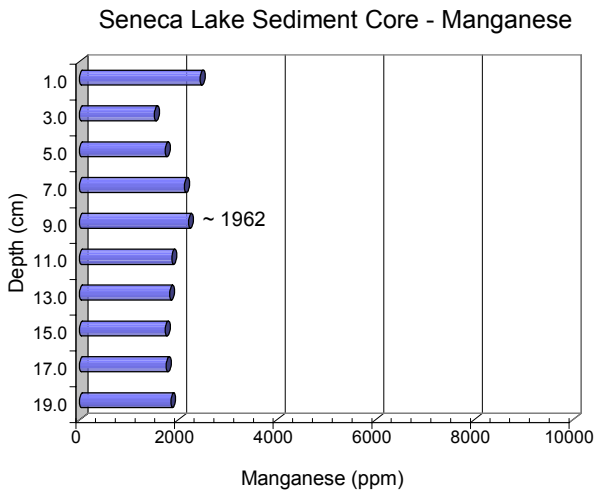
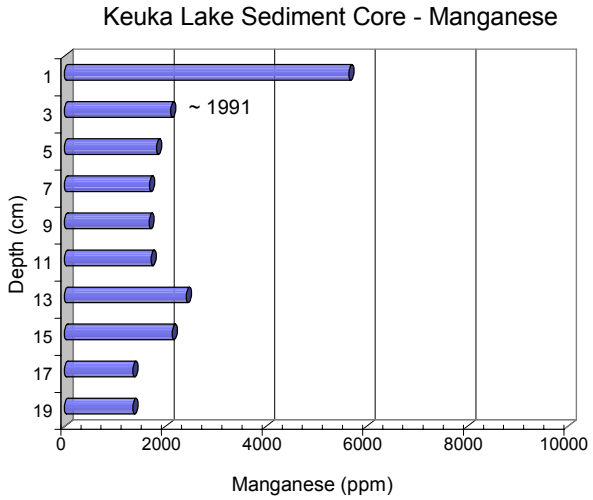
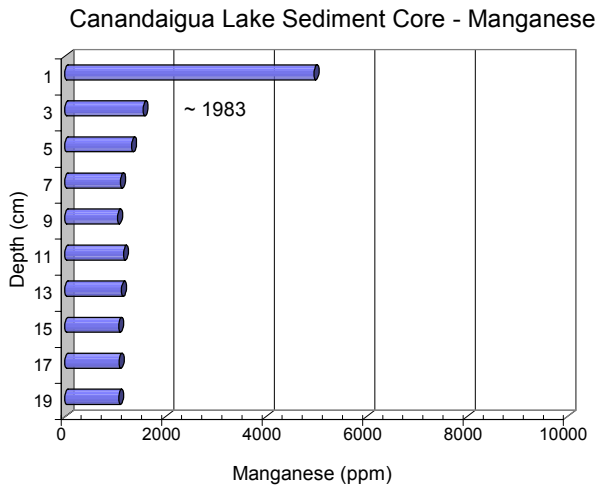
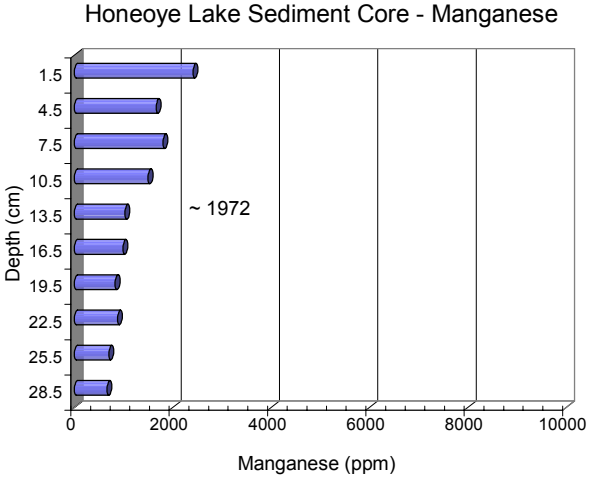


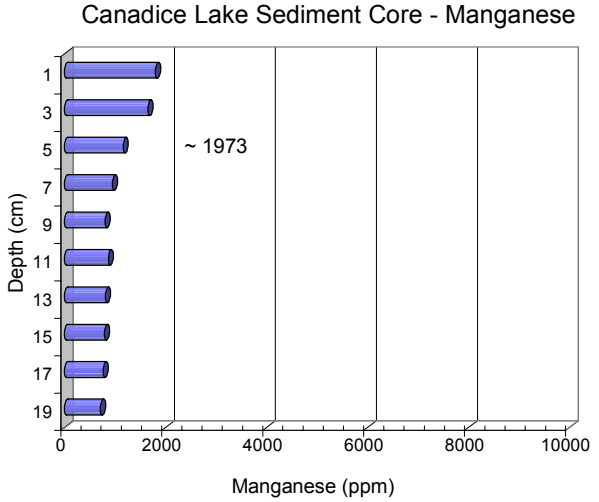
Figure 9.28: Manganese profiles in sediment cores for selected Finger Lakes

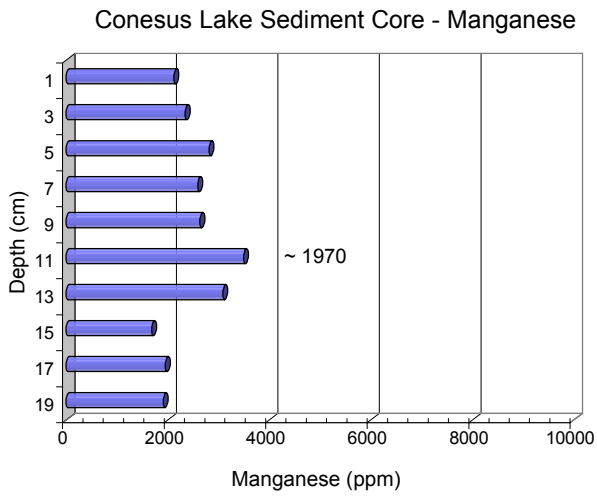












Mercury

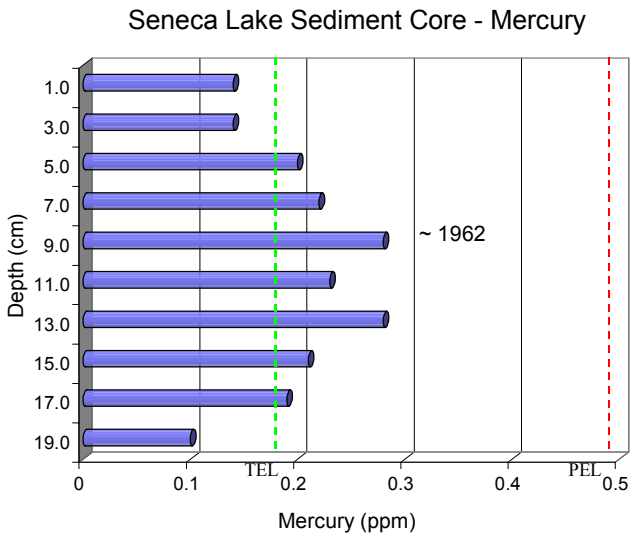
Mercury (Hg) is quite rare in the Earth's crust, and, although mercury can be released by natural processes, anthropogenic sources are the primary concern. Major human sources of mercury to the environment include the burning of fossil fuels and municipal waste incineration. The later route of release underscores the fact that a significant number of consumer products contain, or at one time contained, this metal. This list includes batteries, fluorescent lights, thermometers, and dental amalgams. While several of these products no longer contain mercury, the waste stream has a long "environmental memory".

As with the organochlorine compounds discussed above, concerns over mercury in the environment stem from: (a) its persistence within the environment – mercury tends to cycle rather efficiently through aquatic ecosystems; (b) the ability to bioaccumulate within aquatic food chains; and (c) its toxicity. Mercury is a neurotoxin that can adversely affect the central nervous system.

Unfortunately, results from this study are somewhat inconclusive with respect to mercury levels within the Finger Lakes due to the analytical detection limits of the laboratory methods used. In most instances, the analytical detection levels exceeded the TEL and/or PEL for mercury. Furthermore, analytical detection levels varied approximately 5 fold due to factors such as available sample mass and/or interferences. Thus, attempts to assess spatial variability in sediment mercury levels across the Finger Lakes is not possible with the data set available from this investigation.

With respect to temporal patterns of mercury contamination within the Finger Lakes, only one of the lake cores (Seneca Lake) showed sufficient levels of detection to establish a reasonable temporal profile for mercury (see Figure 9.29). Mercury levels observed within Seneca Lake sediments varied approximately 3 fold. Mercury levels peak at 0.28 mg/kg in approximately 1946 and 1962, and decline thereafter – although the final two sampling periods (1986 and 1994) may indicate that mercury levels have stabilized. The most recent mercury levels are somewhat elevated as compared to the oldest period available (ca. ~ 1922).

Figure 9.29: Seneca Lake sediment core mercury profile



Sediment quality assessment values for mercury are 0.174 and 0.49 for the TEL and PEL, respectively. Once again, analytical detection limits proved problematic when it came to evaluating sediment mercury levels in that the detection levels were frequently above the TEL and PEL. As can be seen from the Seneca Lake profile (Figure 9.29), the deeper sediments exceed the TEL, however, more recent sediments (including surficial sediments) are below the TEL and PEL.

Mercury levels within fish tissue (Lake trout) from the Finger Lakes are generally between 0.1 and 0.9 ppm. This is below the Food and Drug Administration's (FDA) actionable level of 1.0 ppm.

Nickel

Nickel (Ni) is found at relatively low levels within the earth's crust. Anthropogenic uses of nickel include the manufacture of stainless steel and other corrosion-resistant alloys, armor plates and vaults, and plating to provide a protective coating for other metals. Occupational exposure to nickel has been linked to increased risk of nasal and lung cancers. In addition, repeated exposures may lead to asthma and other respiratory ailments. The health and/or environmental effects of lower nickel exposure are not known.

Spatial comparisons of nickel levels within Finger Lakes sediments (Table 9.17) indicate a narrow range of concentrations. For example, in those lakes with intact sediment cores, peak nickel levels ranged from 46.1 ppm in Seneca Lake to 72 ppm within Skaneateles Lake. There was no apparent east-west trend in nickel levels, nor was there significant correlation with lake productivity levels. Once again, as with several other metals, nickel levels within the Cayuga Lake sediments appeared inordinately low – approximately half the level found in the other Finger Lakes. Nickel levels for Hemlock Lake are consistent with the other Finger Lakes.

Table 9.17: Nickel in Finger Lakes sediment cores

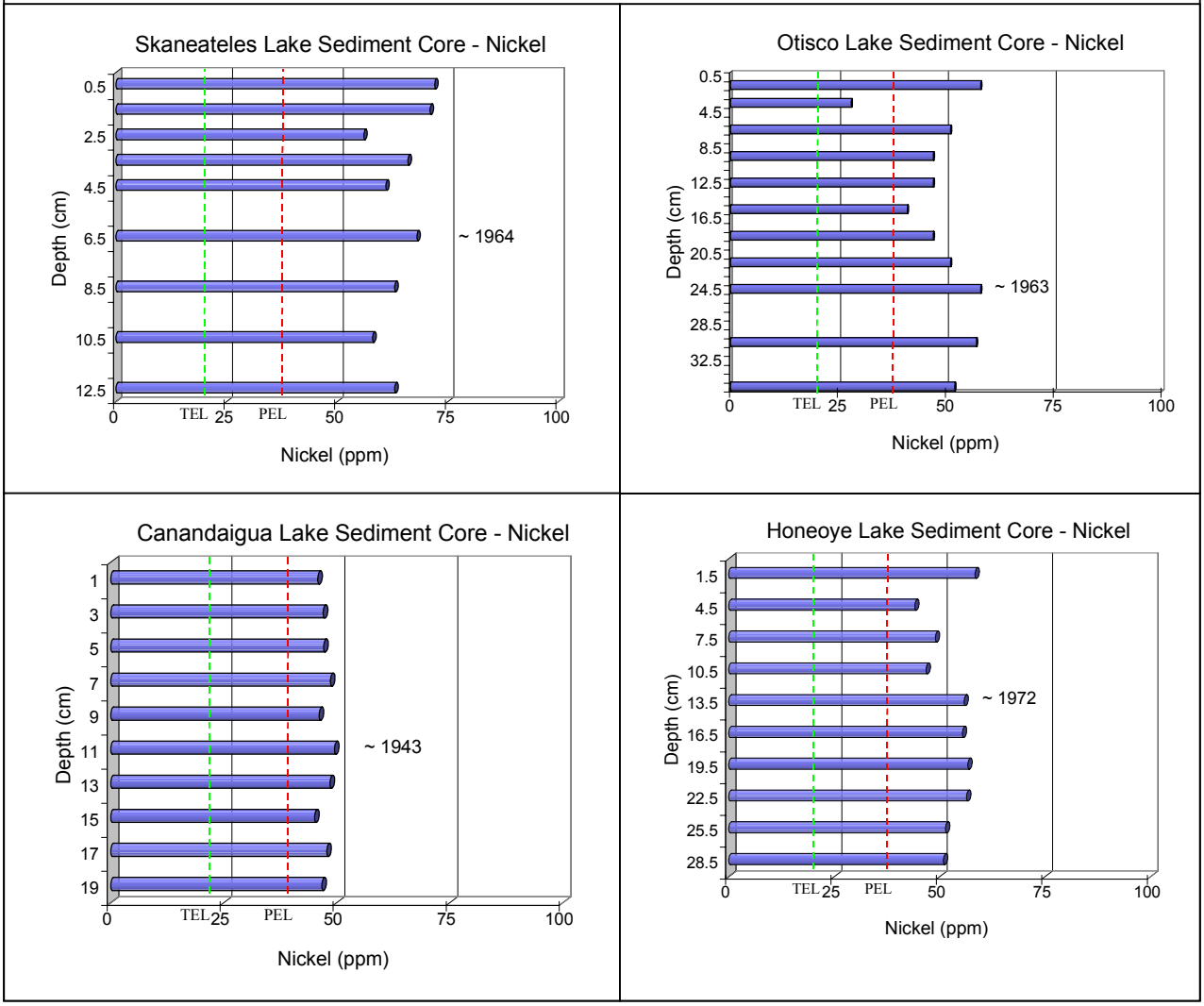
Lake	*Peak Ni (ppm)*	*Depth of Peak (cm)/~ Age*
Otisco	58	1-2 & 24-25 (1994 & 1963)
Skaneateles	72	0-1 (1994)
Owasco	66	12-13 (1965)
* Cayuga	29.9	na
Seneca	46.1	6-8 (1970)
Keuka	50.3	14-16 (1961)
Canandaigua	49.5	10-12 (1943)
Honeoye	58.4	0-3 (1996)
Canadice	53.4	2-4 (1983)
* Hemlock	57.6	na
Conesus	49.2	16-18 (1955)
TEL	18	-
PEL	36	-

* Cayuga Lake and Hemlock Lake cores showed disturbed sediment chronologies.

Temporal trends in sediment nickel levels vary somewhat within the Finger Lakes. For example, peak nickel levels occur between the early 1940s for Canandaigua Lake and the mid-1990s for Honeoye, Skaneateles, and Otisco Lakes. Sediment nickel profiles for several of the Finger Lakes cores are shown in Figure 9.30. While peak nickel levels within several of the lakes occur within surficial sediment layers, the levels do not vary greatly over time. For example, Skaneateles Lake sediments range from 56 – 72 mg/kg, while Honeoye Lake sediments range from 44.1 – 58.4 mg/kg.

The surficial sediments from all of the Finger Lakes cores, with the exception of Cayuga and Conesus Lakes, exceed both the TEL and PEL for nickel. Historical nickel levels (deep sediments) also consistently exceed these assessment values within each of the lakes. The uniform pattern observed for nickel levels, both spatially across lakes and temporally within given lakes, would suggest that nickel inputs are diffuse in nature and likely originating from either atmospheric transport or geological weathering. The environmental significance of the observed nickel levels in not clear.

Figure 9.30: Sediment nickel profiles from selected Finger Lakes



Zinc

Zinc (Zn) is found at relatively low levels within the earth's crust. Industrial uses of zinc include the manufacture of steel, dry cell batteries, pharmaceuticals, paint, rubber, dyes, wood preservatives, and the production of alloys (brass and bronze). Although zinc is an essential element in the human diet, ingestion or inhalation of elevated amounts of zinc can cause anemia and pancreatic damage.

Zinc levels within the Finger Lakes sediment cores were fairly uniform (see Table 9.18). For example, in those lakes for which intact sediment cores were available, peak zinc levels varied by approximately 40 percent. The lowest sediment zinc levels were observed in Keuka Lake, while the highest zinc levels observed are in Skaneateles Lake. The peak zinc level observed in Hemlock Lake sediments was 156 mg/kg, which is relatively consistent with the levels observed in most of the other Finger Lakes. However, as found with other metals, the peak zinc level observed within Cayuga Lake is unusually low.

Table 9.18: Zinc in Finger Lakes sediment cores

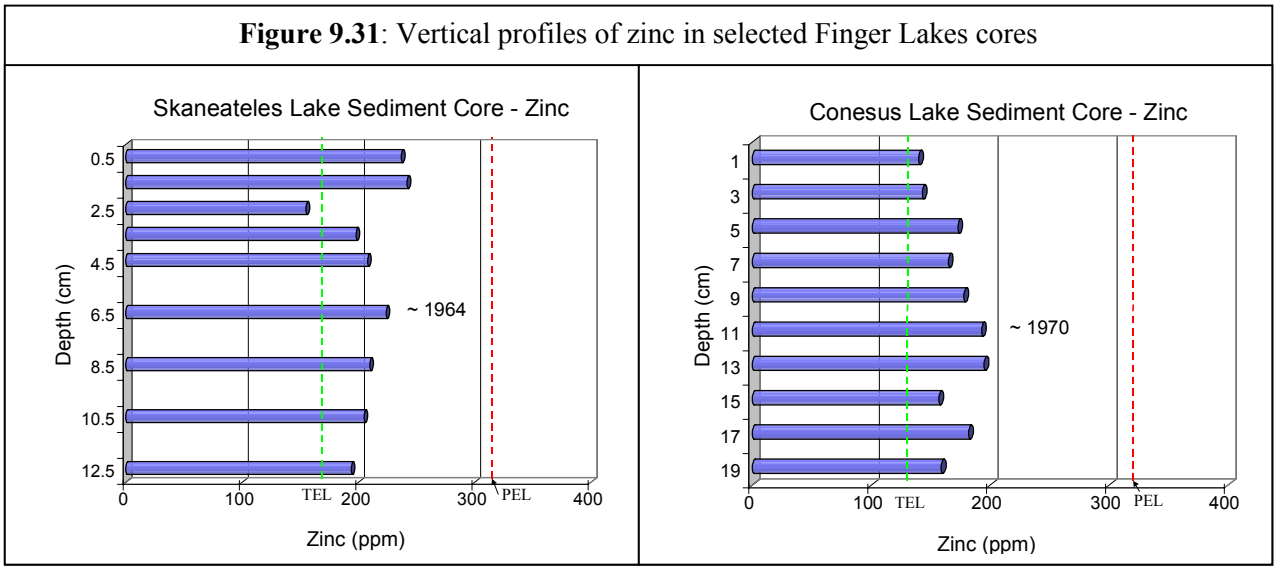
Lake	*Peak Zn (mg/kg)*	*Depth (cm)/~ Age*
Otisco	194	24-25 (1963)
Skaneateles	242	1-2 (1989)
Owasco	180	15-16 (1957)
* Cayuga	96.5	na
Seneca	176	6-8 (1970)
Keuka	168	14-16 (1961)
Canandaigua	173	6-8 (1963)
Honeoye	170	0-3 (1996)
Canadice	180	2-4 (1983)
* Hemlock	156	na
Conesus	195	12-14 (1965)
TEL	123	-
SEL	315	-

* Cayuga Lake and Hemlock Lake cores showed disturbed sediment chronologies.

Temporal trends for zinc within the Finger Lakes are inconsistent. For example, the trend within Conesus Lake is that of moderately declining zinc levels. On the other hand, the trend in Skaneateles Lake is toward moderately increasing levels of zinc. Vertical sediment profiles of zinc for these two lakes are presented in Figure 9.31.

Zinc levels within the sediments of nearly all of the Finger Lakes (Cayuga Lake being the only exception) are above the TEL, however, all were below the PEL. As discussed with nickel levels above, the findings would suggest that zinc inputs to the lake are diffuse in nature, and likely stem from either atmospheric transport and/or geological weathering.

Figure 9.31: Vertical profiles of zinc in selected Finger Lakes cores



Chapter 10: Recommendations

As discussed above, the *Sediment Core Investigation* provides some important insight regarding water quality conditions within the Finger Lakes. However, the results of this investigation could be substantially enhanced by a number of additional activities as follows.

First, while the current study was successful in defining the chronology of chemical inputs within 9 of the 11 Finger Lakes, results were not sufficient for 2 of the lakes, namely, Cayuga Lake and Hemlock Lake. In both instances, radiometric findings were insufficient to define an accurate chronology of chemical patterns. It is suspected that the sediment cores from these two lakes were disturbed in some manner over time. Thus, it would be advantageous to revisit these 2 water bodies in an effort to complete our understanding of sediment chemical patterns within this important series of lakes. Equipment limitations with respect to maximum water depth for core collection was the likely reason for failure on Cayuga Lake, and future efforts should focus on deeper waters. The reason(s) for failure on Hemlock lake are not clear, however, it is recommended that follow-up sediment core investigations involve the collection of multiple cores and preliminary evaluation of radiometric markers in order to select the best candidate core for full assessment. A second rationale for revisiting Cayuga Lake relates to the fact that many of the inorganic results from the sediment core were well below levels observed within the other Finger Lakes, including Hemlock Lake. The reason(s) for this disparity are not clear at this point. Landuse patterns within the Cayuga Lake Watershed are not significantly different from those in certain other Finger Lakes watersheds, and, thus, the results are somewhat puzzling.

Second, *arsenic* findings within several of the Finger Lakes warrant additional study to assess both possible causes for observed increases within the upper sediments and possible environmental implications (human health and ecosystem). While limited water column sampling would appear to allay immediate concerns, follow-up investigation is certainly in order. For example, follow-up water column monitoring is warranted and should include: (a) lower analytical detection levels in the range of 1 ppb or better, given EPA's proposed revision in the MCL for arsenic, (b) better spatial resolution (both horizontal and vertical) to assess potential exposure, particularly in proximity to existing water intake locations, (c) better temporal resolution – particularly including measurements under differing dissolved oxygen conditions, and (d) arsenic speciation to determine the various forms of arsenic which are present. In addition, investigation of possible arsenic sources and its ecosystem processing within the Finger Lakes and surrounding watersheds is advisable. Finally, comparisons of the Finger Lakes arsenic findings with other lake sediment cores (particularly within the Lake Ontario Basin) would be of value.

Third, as with arsenic, *manganese* findings indicate significant enrichment of upper sediments within several of the Finger Lakes. While there are currently no established sediment quality assessment values for manganese, the levels observed, coupled with their coincidence with arsenic elevations, would warrant additional investigation. It is likely that the source(s) and/or mechanism(s) responsible for the observed arsenic enrichment are also responsible for the observed enrichment in manganese levels. Thus, it is recommended that any follow-up study of arsenic include investigation of manganese as well.

Fourth, *DDT* levels within the *biota* of several of the Finger Lakes (e.g., Conesus, Keuka, and Seneca Lakes) should continue to be monitored. It is important to determine future trends in DDT levels (e.g., decline, plateau, or increase) within predatory fish. An effort should be made to systematize this effort across each of the Finger Lakes to allow comparisons between lake systems.

Fifth, *PCB* results from this study were not definitive due to analytical detection limitations. Findings with respect to PCB congeners in several of the lakes (Conesus and Seneca Lakes) may warrant additional investigation. Core samples from each of the Finger Lakes for which PCB congener analyses were performed indicate that PCB congener levels exceed the TEL for total PCBs, and levels within several of the lakes (Otisco, Skaneateles, Owasco, Seneca, Keuka, Canadice, and Conesus Lakes) also exceeded the PEL for total PCBs. The fact that several of the lakes exhibited higher total PCB levels than did Canadice Lake (which currently has a fish consumption advisory) was somewhat surprising. It is recommended that other available information (e.g., fish flesh data, hazardous waste site information, etc.) be evaluated to determine if the observed PCB levels justify further investigation. Any future investigations should emphasize PCB congeners rather than Aroclors.

Sixth, the sediments from a number of the Finger Lakes were found to exceed the upper sediment assessment value for *nickel*. The significance of these findings should be assessed with respect to effects on resident biota and/or human health concerns, and the levels should be compared to levels in other parts of New York State.

Seventh, our investigation of *mercury* trends within the Finger Lakes was significantly hampered by analytical detection issues. The only acceptable, or reasonably complete, profile came from Seneca Lake and showed a moderate decline in mercury levels over the past several decades. It would be instructive to assess mercury trends in the other Finger Lakes. However, future sediment coring efforts will need to critically assess analytical detection issues if those efforts are to be fruitful. In particular, should Cayuga Lake and Hemlock Lake be revisited as discussed in recommendation 1 above, an effort should be made to utilize analytical methods capable of detecting mercury within those cores.

Eighth, observed *calcium* increases over the past half-century warrant additional investigation. The possible causes for the observed increases should be evaluated, and the ramifications of these increases should be assessed. In particular, the implications of increasing calcium levels as they relate to Zebra mussel population dynamics should be investigated.

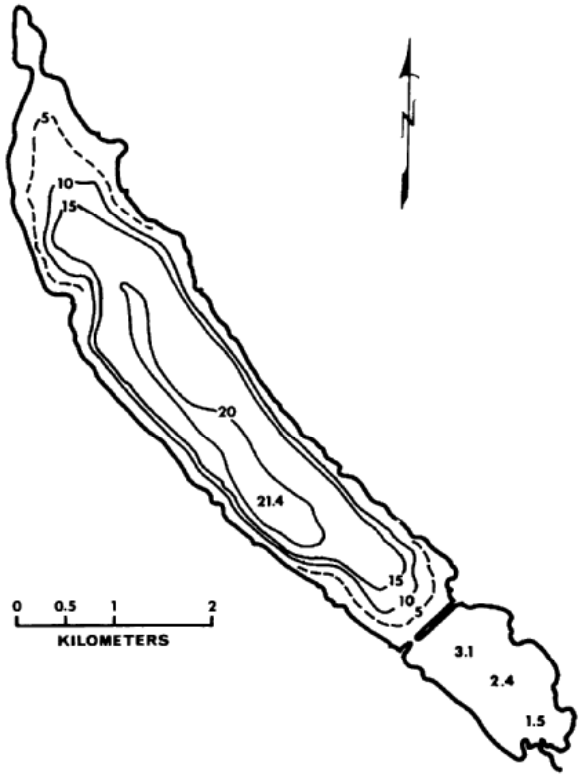
Chapter 11: Individual Lake Summaries

Previous discussions focused upon overall conditions within the 11 Finger Lakes and comparisons between the lakes. The purpose of this chapter is to provide a synopsis for each individual lake with respect to current conditions, chemical trends, and issues of concern. The lakes are discussed moving from east to west, beginning with Otisco Lake and finishing with Conesus Lake.

Otisco Lake

Otisco Lake (see Figure 11.1) is one of the smaller Finger Lakes. The lake and entire watershed are located in Onondaga County. The lake is a multi-purpose water body, and is a source of public water supply for the City of Syracuse. Otisco Lake has a water use classification of "AA", and is currently listed on the NY State PWL due to bathing impairments related to silt. The lake is somewhat unusual in that it is segmented by a causeway. The two segments are joined by a rather narrow opening on the southwest side of the structure. The southern (or southeast) portion of the lake is quite shallow and receives a large percentage of the inflow to the lake. This situation, coupled with the limited mixing between the two segments, results in significant differences in water quality conditions in the adjoining segments. The southeast portion of the lake tends to show significantly higher concentrations of phosphorus and chlorophyll a, and lower water clarity. The primary focus of this investigation is on the north-west, or main, portion of the lake.

Figure 11.1: Otisco Lake



Otisco Lake is best characterized as eutrophic due to its chlorophyll *a*, water clarity, and hypolimnetic dissolved oxygen levels. Findings suggest that trophic conditions within the lake have increased moderately over the past several decades. This is reflected by the fact that total phosphorus and chlorophyll *a* levels have increased somewhat since the early 1970s. The hypolimnion of Otisco Lake becomes anoxic during the summer and early fall. It is unclear whether anoxic conditions within the hypolimnion of Otisco Lake are human-induced or natural in origin. Major ion trends within Otisco Lake over the past several decades indicate *declines* in calcium, magnesium, and alkalinity levels, and *increases* in sodium, chloride, and sulfate levels.

Sediment core findings from Otisco Lake show a sediment accumulation rate of 0.74 cm/year. This is the highest sediment accumulation rate of all the Finger Lakes. *Organic* chemical findings from the Otisco Lake sediment core are limited to PCB congeners (organochlorine pesticides were not run on these core samples) from a single core segment. The total PCB congener concentration found in this core segment is 245 ppb, which is in the middle range of levels found in the other Finger Lakes, and is above the TEL and slightly below the PEL for total PCBs. No clear Aroclor pattern was present in the sample. DDT levels were not assessed for Otisco Lake. *Inorganic* chemical findings from the Otisco Lake sediment core indicate that copper levels exceed the TEL within the surficial sediments. Furthermore, historical copper levels exceed the PEL for copper. Copper levels within Otisco Lake sediments raged from 35–308 ppm. Copper levels began to rise markedly in the early 1960s and reached a maximum concentration in the early 1970s. The trend in copper levels is likely the result of copper sulfate treatments for the control of algae that have occurred periodically within the lake since the early 1960s. Additional inorganic findings indicate: (a) Arsenic levels within Otisco Lake range from below detection to 11 ppm, and two of the mid-depth core segments exceed the TEL; (b) Calcium levels within Otisco Lake *sediments* have increased significantly during the past half-century, which is in contrast to *water column* trends over the past three decades. Calcium levels range from 17,600-94,900 ppm; (c) Chromium levels range from 28-58 ppm, and show no clear temporal trend - levels are above the TEL; (d) Manganese levels range from 890-1,660 ppm, and have increased modestly over the past several decades; (e) Nickel levels range from 28-58 ppm, with no apparent temporal trend, and are above the PEL; and (f) Zinc levels range from 120-194 ppm with no apparent temporal trend, and are above the TEL.

Recommendations for Otisco Lake are as follows. *First*, management actions to control cultural eutrophication within the watershed are advisable. There are currently several efforts underway to implement Best Management Practices (BMPs) within the watershed. Addition efforts should be directed at understanding the internal cycling of phosphorus within the lake and the impacts of anoxia within hypolimnetic waters. *Second*, water quality trends indicate an increase in the concentration of chloride and sodium levels within the lake. Thus, measures to control inputs of chloride and sodium to the lake should be implemented. *Third*, sediment core PCB findings would suggest that periodic monitoring of PCB levels in aquatic biota should be continued in Otisco Lake. *Fourth*, calcium increases observed within the sediments of Otisco Lake over the past several decades may lead to an exacerbation of Zebra mussel related issues within the lake in coming years. Thus, as with the other Finger Lakes, it is suggested that Zebra mussel population dynamics be studied within the lake. The study should include examination of population dynamics, investigation of the cause(s) of calcium increases within lake sediments, and the availability of pore water calcium to Zebra mussel populations. *Fifth*, as with a number of the Finger Lakes, nickel levels within Otisco Lake sediments exceed the TEL and PEL. Thus, efforts to understand the origin(s) and implications of these nickel levels are advisable.

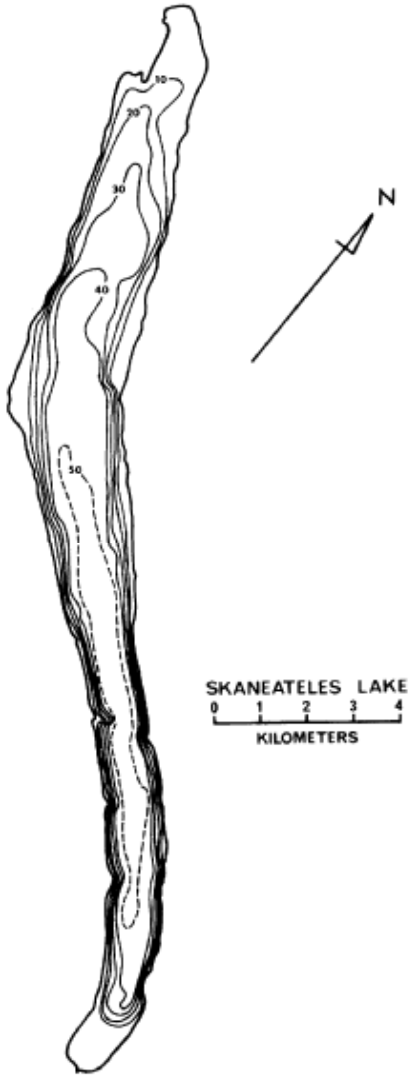
Skaneateles Lake

Skaneateles Lake (see Figure 11.2) is one of the six larger Finger Lakes. The lake itself is located in Onondaga County, with the watershed extending into Cayuga County and a small portion of Cortland County. The lake is a multi-use water body, and is a major source of public water supply for the City of Syracuse. Skaneateles Lake has a water use classification of "AA", and there are significant watershed protection measures in place within the watershed. In fact, Skaneateles Lake is one of only eight lakes within New York State with explicit statutory restrictions with respect to sewage discharge within the lake and watershed. Article 17, Title 17, section 17-1709 of New York State Environmental Conservation Law (ECL) states:

> "*No person or corporation shall cause or permit the fall, flow or discharge into Lake George or Skaneateles lake or any of their tributaries, of any sewage matter, or other foul, noxious or deleterious, solid or liquid matter or effluent from any sewage disposal plant, or any matter that may be declared such by the board of health of any municipality adjacent to such lakes where any such fall, flow or discharge shall occur."* (NY State ECL, 2000).

Despite this protection, Skaneateles Lake is currently listed on the NY State PWL due to water supply concerns related to pathogens.

Figure 11.2: Skaneateles Lake



Not intended for navigation purposes.

Skaneateles Lake is an oligotrophic lake, as evidenced by total phosphorus, chlorophyll *a*, water clarity, and hypolimnetic dissolved oxygen levels. Findings suggest a marked reduction in trophic conditions over the past several decades. For example, the mean total phosphorus concentration observed during the present study is 4.0 ug/l, as compared to approximately 6.0 ug/l in the early 1970s. Similar reductions are apparent for chlorophyll *a*. The mean chlorophyll *a* concentrations measured in the early 1970s and the late 1990s, are approximately 2.0 ug/l and 0.7 ug/l, respectively. While water clarity levels have not changed by a similar degree, they have increased. Mean Secchi Disk depth measurements for the two periods were 6.6 m (1970s) and 7.7 m (1990s). These changes in trophic indicator levels are likely the result of management actions (e.g., phosphate detergent ban, on-site system controls, etc.) that have taken place over the past quarter century. The hypolimnetic waters of Skaneateles Lake remain well oxygenated throughout the growing season. Major ion trends within Skaneateles Lake over the past several decades indicate *declines* in magnesium, and sulfate levels, and *increases* in sodium, and chloride levels.

Sediment core findings from Skaneateles Lake indicate a sediment accumulation rate of approximately 0.2 cm/year. This is one of the lowest accumulation rates recorded within the Finger Lakes and reflects the relatively low productivity within the lake. *Organic* chemical findings from the Skaneateles Lake sediment core are limited to PCB congener levels from a single core segment. The total PCB congener concentration observed (286 ppb) is in the middle range of levels observed in the other Finger Lakes, and is above the TEL and slightly above the PEL for total PCBs. The pattern is not consistent with any specific Aroclor formulation, however, there were elevations in both lower chlorinated congeners and higher chlorinated congeners. DDT levels were not assessed in Skaneateles Lake. *Inorganic* chemical findings for Skaneateles Lake indicate a marked elevation in arsenic and manganese concentrations within the upper sediment layers of the lake. This pattern is also apparent in several other Finger Lakes cores. Arsenic and manganese levels within Skaneateles Lake sediments range from 10-34 ppm and 1,290-8,810 ppm, respectively. The cause(s) of the surficial sediment enrichment in arsenic and manganese is not certain – see discussion in Chapter 9. The arsenic levels detected in the upper sediment layers of Skaneateles Lake exceed both the TEL and PEL. As indicated earlier, follow-up water column monitoring conducted during 1999, albeit limited, did not detect arsenic within the water column. Additional inorganic chemical findings from the Skaneateles Lake sediment core analysis include the following: (a) Calcium levels range from 8,320-33,300 ppm, and have increased markedly over the past two decades; (b) Chromium levels range from 32-55 ppm, with no apparent temporal trends, and exceed the TEL but are below the PEL; (c) Copper levels range from 44-78 ppm and are generally static over time – levels exceed the TEL but are below the PEL, (d) Lead levels range from below detection to 102 ppm and have declined modestly over time, but remain above the TEL; (e) Nickel levels range from 56-72 ppm and remain largely constant over time, however, levels exceed both the TEL and PEL; (f) Zinc levels range from 155-242 ppm and have increased somewhat in the last decade, or so. Zinc levels exceed the TEL.

Recommendations for Skaneateles Lake and its surrounding watershed are as follows. *First*, efforts to control nutrient loading to Skaneateles Lake over the past several decades appear to have been effective, as evidenced by reductions in primary productivity (algal growth) over the intervening time period. Therefore, it is recommended that these measures continue in the future. *Second*, chloride and sodium levels have increased within Skaneateles Lake over the past several decades. Thus, measures to control the input of salt to the lake should be implemented and/or enhanced. *Third*, sediment core PCB findings would suggest that continued monitoring of PCB levels in aquatic biota is warranted within Skaneateles Lake. *Fourth*, calcium increases observed within the sediments of Skaneateles Lake over the past several decades may lead to an exacerbation of Zebra mussel related issues within the lake in coming years. Thus, as with the other Finger Lakes, it is suggested that Zebra mussel population dynamics be studied within the lake. The study should include examination of population dynamics, investigation of the cause(s) of calcium increases within lake sediments, and the availability of pore water calcium to Zebra mussel populations. *Fourth*, as discussed above, sediment core findings indicate an enrichment of arsenic and manganese within the upper sediment layers of Skaneateles Lake, as well as several other Finger Lakes. It is recommended that additional investigation of this phenomenon be undertaken. Future study should focus upon the following: (a) implications for public exposure to arsenic, particularly via drinking water supplies – while preliminary investigations proved encouraging, additional study is warranted, and (b) the cause(s) for the observed enrichment in arsenic and manganese levels within upper sediments – is the underlying cause(s) of the observed enrichment related to increased arsenic loading within the watershed, physio-chemical processing of the compounds, reductions in primary productivity within the lake, etc. *Fifth*, as with a number of the other Finger Lakes, nickel levels within the sediments of Skaneateles Lake are above the TEL and PEL. Thus, additional study regarding: (a) the source(s) of nickel to the Skaneateles Lake watershed, and (b) possible adverse environmental effects is warranted.

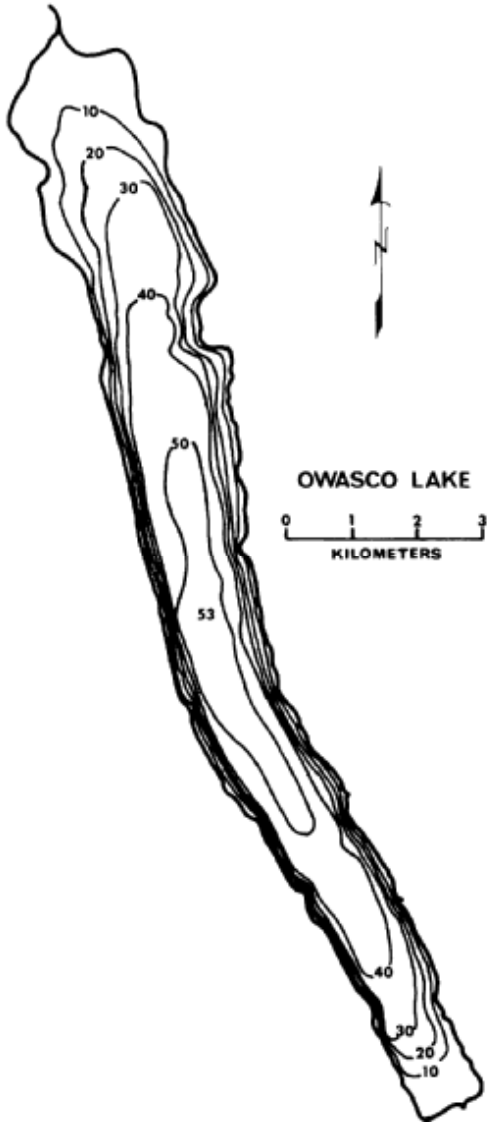
Owasco Lake

Owasco Lake (see Figure 11.3) is one of the six larger Finger Lakes. The lake itself is entirely within Cayuga County, while the watershed includes parts of Cayuga County and Tompkins County. Owasco Lake is a multi-use water body. The lake has a water use classification of "AA(T)", and serves as a source of water supply for the City of Auburn and the Town of Owasco. As with Skaneateles Lake, Owasco Lake is explicitly protected by NY State ECL. Article 17, Title 17, section 17-1704 of New York State Environmental Conservation Law (ECL) states:

> "*No person or corporation shall cause or permit the fall, flow or discharge into the surface waters of the Owasco Lake watershed extending from the city dam on the outlet to the existing Moravia village outfall sewer on the inlet, of any sewage matter, or other foul, noxious or deleterious, solid or liquid matter or effluent from any wastewater disposal system located therein except for those operating under a duly authorized permit from the state or county health departments and except for run-off from accepted agricultural practices*." (NY State ECL, 2000).

Despite this protection, Owasco Lake is currently listed on the NYSDEC PWL due to bathing impairments related to pathogens.

Figure 11.3: Owasco Lake



Not intended for navigation purposes.

Owasco Lake is best characterized as mesotrophic with respect to all three trophic indicators. The lake has shown a moderate decline in primary productivity over the past 2-3 decades as demonstrated by the reduction in chlorophyll *a* levels from 5.5 ug/l in the early 1970s to 3.8 ug/l in the late 1990s. The other two trophic indicators have shown less significant changes, with water clarity levels declining only marginally, and total phosphorus levels remaining, essentially, constant. As in earlier years, the hypolimnion of Owasco Lake remains fairly well oxygenated throughout the growing season. Major ion trends within Owasco Lake over the past several decades indicate *declines* in calcium and sulfate levels, and *increases* in sodium and chloride levels. Owasco Lake was the only one of the Finger Lakes not to show a marked decline in magnesium concentration over the past several decades. The reason for this exception is not clear. Sediment core findings from 1998 regarding arsenic enrichment (see further discussion below) prompted follow-up water column sampling of all the Finger Lakes during 1999. This monitoring recorded only one sample with a detectable level of arsenic – this was an epilimnetic sample taken from Owasco Lake in September 1999 at a depth of approximately 4 m. The arsenic concentration of this sample was 10 ug/l, which is just above the detection level. Interestingly, Owasco Lake did not exhibit the marked arsenic enrichment within surficial sediments that was apparent in several of the other Finger Lakes.

Sediment core findings from Owasco Lake indicate a sediment accumulation rate of 0.38 cm/year. This is in the middle range of sediment accumulation rates observed within the Finger Lakes. *Organic* chemical findings from the Owasco Lake sediment core are limited to PCB congeners from a single core segment. The sediment PCB congener level was 374 ppb, which is in the upper range of levels observed within the Finger Lakes, and exceeds the PEL for total PCBs. The congener pattern was dominated by lower chlorinated congeners, indicative of Aroclor 1242 or 1016. DDT levels were not assessed in Owasco Lake. *Inorganic* chemical findings from the Owasco Lake sediment core are as follows: (a) Arsenic levels range from 4-14 ppm and demonstrate a slight increase over the past several decades. Arsenic levels are above the TEL but below the PEL; (b) Calcium levels range from 33,600-90,200 ppm, and show a marked increase beginning in the early 1960s, with a nearly three fold increase since the 1940s; (c) Chromium levels range from 27-52 ppm and show significant fluctuation over time. Chromium levels are above the TEL, but below the PEL; (d) Copper levels range from 29-44 ppm and are moderately elevated within surficial sediments - levels are above the TEL; (e) Lead levels range from below detection to 73 ppm. Lead levels reach a maximum in the mid-1960s and show a marked decline over the past 3-4 decades. Lead levels are above the TEL, but below the PEL; (f) Manganese levels range from 596-3,630 ppm and show significant enrichment within surficial sediment layers; (g) Nickel concentrations range from 39-66 ppm and fluctuate somewhat over time, but show no consistent trend. Nickel levels are above the TEL and PEL; and (h) Zinc levels range from 115-176 ppm and also fluctuate somewhat over time. Zinc levels are above the TEL but below the PEL.

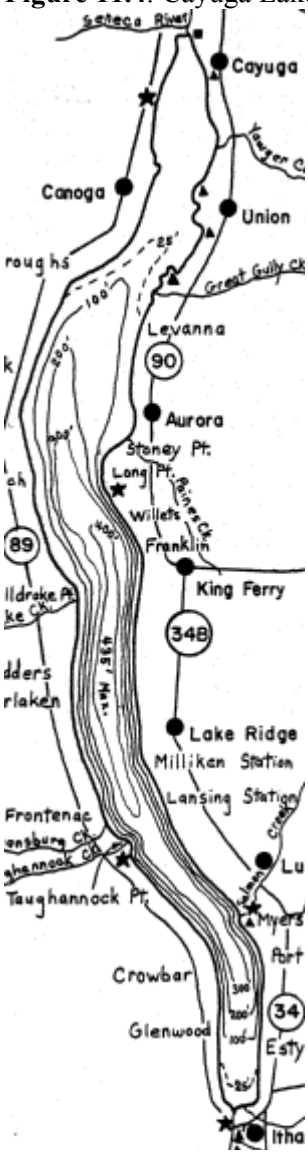
Recommendations for Owasco Lake are as follows. *First*, unlike most of the other large Finger Lakes, Owasco Lake showed little reduction in ambient total phosphorus levels between the 1970s and 1990s. This would suggest that Owasco Lake has not had a significant reduction in external phosphorus loading over the past several decades. Therefore, efforts to reduce external nutrient loading to Owasco Lake should continue. *Second*, chloride and sodium levels within Owasco Lake have increased over the past several decades. Thus, measures to control the input of salt to the lake should be implemented. *Third*, sediment core PCB findings from Owasco Lake would suggest that monitoring of PCB levels in aquatic biota should be continued. *Fourth*, sediment core findings indicate a moderate degree of arsenic enrichment, and a more pronounced, manganese enrichment in Owasco Lake surficial sediments. While sediment arsenic enrichment is less pronounced in Owasco Lake than in some of the other Finger Lakes, the fact that a water column sample did show a detectable level of arsenic, would suggest the need to include Owasco Lake in future arsenic investigations within the Finger Lakes – see Sediment Core recommendations. *Fifth*, calcium increases observed within the sediments of Skaneateles Lake over the past several decades may lead to an exacerbation of Zebra mussel related issues within the lake in coming years. Thus, as with the other Finger Lakes, a Zebra mussel monitoring program is recommended for Owasco Lake. The study should include examination of Zebra mussel population dynamics, investigation of the cause(s) of calcium increases within lake sediments, and an assessment of the availability of calcium in sediment pore water to Zebra mussel populations. *Sixth*, as with a number of the Finger Lakes, nickel concentrations within Owasco Lake sediments are elevated. Thus, additional study of the origin(s) and possible environmental effects of nickel levels may be warranted.

It is important to reiterate that this study did not assess bacteriological conditions within the lakes. Given past issues regarding beach closures and coliform contamination within the lake, it would seem prudent to continue efforts to identify and control bacteriological contaminant sources to the lake.

Cayuga Lake

Cayuga Lake (Figure 11.4) is the longest of the Finger Lakes, and second only to Seneca Lake with respect to lake volume. The lake basin itself is within Cayuga, Seneca, and Tompkins Counties, while the watershed extends slightly into three additional counties, namely, Cortland, Schuyler, and Tioga Counties. Cayuga Lake is a multi-use water body, and supports uses ranging from water supply to wastewater assimilation. Cayuga Lake serves as a source of water supply for a number of municipalities within the watershed, including the City of Ithaca, the Towns of Dryden and Lansing, and the Villages of Aurora, Cayuga, Cayuga Heights, and Seneca Falls. The City of Ithaca, which is the largest municipality within the Finger Lakes Region, is situated at the southern end of the lake. Cayuga Lake carries several water use classifications ranging from "AA(T)"for most of the deep basin to "B" at the northern end of the lake.

Figure 11.4: Cayuga Lake



Not intended for navigation purposes.

Several segments of Cayuga Lake are listed on the NYSDEC PWL. The northern end of the lake is listed on the PWL due to swimming and boating impairments related to aquatic plant growth. The primary pollutant of concern in this portion of the lake is nutrients. The southern end of the lake is listed on the PWL due to water supply issues and swimming impairments. The primary pollutants in this portion of the lake are sediments and nutrients. The southern end of Cayuga Lake is also listed on the 303(d) list.

Given the variation in water quality conditions present in Cayuga Lake, monitoring sites were established in both the main lake (proximate to Taughannock Falls State Park) and within the shallow southern delta (see Table 4.1 for approximate coordinates of monitoring sites). For the purposes of this report, the southern delta or "shelf" of the lake is defined as extending from the south-eastern terminus of the lake north for approximately 2.0 km to McKinney's Point and on the west side of the lake from the confluence with Indian Creek to the south-west end of the lake – this is approximately the area carrying a water use class of "A" (NYSDOS, 1999). The main, or deep portion of the lake is defined as extending from the northern edge of the south shelf north to Cooneys Corners Road (Lat. 42 47 51, Long. 76 40 47.9). The northern shelf is defined to be from Cooney's Corners Road north to the end of the lake. The remainder of this discussion will focus upon the main portion of the lake and the southern shelf. Unfortunately, resource limitations and logistical considerations precluded sampling of the northern portion of Cayuga Lake.

Main Lake

Water quality conditions in the main portion (deep basin) of Cayuga Lake are generally good. From a trophic perspective, the main lake is best characterized as borderline between oligotrophic and mesotrophic. Results from this investigation indicate seasonal means for total phosphorus, chlorophyll *a*, and Secchi Disk depth of approximately 10 ug/l, 3.5 ug/l, 4.0 m, respectively. Other studies [Sterns and Wheler, 1997, and Upstate Freshwater Institute (UFI), 2000)] show somewhat different trophic conditions for the deep lake – see Table 11.1. These differences are likely due to variations in site selection, sampling methodology, etc. Trends from this study indicate a decline in the major trophic indices over the last several decades. Total phosphorus levels exhibit the most pronounced decline - from approximately 18 ug/l during the late 1960s to approximately 10 ug/l in the later 1990s. Less pronounced changes are apparent for chlorophyll *a* (4.2 ug/l to 3.5 ug/l) and Secchi Disk depth (3.6 m to 4.0 m). The disparity in the level of change for the various trophic indicators is somewhat puzzling. The reduction in productivity levels within the main lake is generally viewed as a positive development. The marked declines in total phosphorus levels are likely the result, at least in part, of the nutrient control measures discussed earlier. However, it is possible that the introduction of Zebra mussels to the lake have also contributed to observed nutrient reductions. As in the past, the hypolimnetic waters of the Cayuga Lake appear to remain fairly well oxygenated throughout the growing season. The trend for major ions within the main portion of Cayuga Lake over the past several decades indicate substantial reductions in sodium and chloride, and more modest declines in sulfate and alkalinity levels. The trend observed in sodium and chloride levels within Cayuga Lake continues a trend observed during previous studies (Effler, et al. 1989). Effler, et al. modeled chloride concentrations within the lake and concluded that concentrations would continue to decline to a steady-state concentration of approximately 30 mg/l by approximately circa 2000.

Sediment core findings from Cayuga Lake are limited due to several issues. *First*, radiometric findings were not sufficient to establish sediment chronologies from the sediment core (see earlier discussion). Previous studies (Yager, 2001) indicate an average sediment accumulation rate of approximately 0.4 cm/year in Cayuga Lake, which is in the middle range of sediment accumulation rates observed within the Finger Lakes. Given that radiometric dating proved unsuccessful, chemical findings from the Cayuga Lake sediment core can only be interpreted as composite values. *Second*, chemical findings from the Cayuga Lake sediment core indicate remarkably low levels for a number of chemical compounds. *Organic* chemical findings indicate total PCB levels are the lowest observed within the Finger Lakes cores, and total DDT levels were the second lowest for the Finger Lakes. *Inorganic* chemical findings for Cayuga Lake also suggest unusually low levels of many of the trace elements investigated during this study. For example, the concentrations of arsenic, chromium, copper, lead, nickel, and zinc in the Cayuga Lake sediment core are the lowest of all of the Finger Lakes. In some instances, chemical levels observed within the Cayuga Lake sediment core are *less than half* the levels observed in the other Finger Lakes (including Hemlock Lake – which also exhibited a radiometric profile indicative of disturbed sediments). Thus, it is believed that the chemical levels observed within the Cayuga Lake core are not indicative of levels for Cayuga Lake sediments in general.

There are several possible explanations for these observations. *First*, it is conceivable that the Cayuga Lake sediment core is substantially lower in organic material than are cores from the other Finger Lakes. Organic material is particularly effective in sorbing many chemicals. Thus, if the Cayuga Lake sediment core contained less organic material relative to the sediment cores from the other Finger Lakes, it would have a diminished capacity to sorb chemical substances. It is possible that the Cayuga Lake core could have been from a "sand bar" or shelf area – and may have contained a disproportionate amount of large grained or sand particles. Unfortunately, organic carbon levels (and particle sizes) were not assessed in the Cayuga Lake core, so evaluation of this hypothesis cannot be accurately assessed. As indicated earlier, the sample location for the Cayuga Lake sediment core had to be adjusted (moved to shallower water) due to equipment limitations (winch cable length). By comparison, the Cayuga Lake sediment core

was collected in approximately 65 m of water, whereas, the Seneca Lake core was collected in approximately 130 m of water. *Second*, it is possible that the sample location for the Cayuga Lake sediment core was subject to elevated depositional rates due to productivity levels within the south lake. If this were the case, the large influx of organic material could have a dilutional effect on other chemical substances in the core and result in lower chemical concentrations – recall that chemical levels are reported on a weight per weight basis. As will be discussed below, productivity levels within the southern end of Cayuga Lake are markedly higher than in the main lake. Furthermore, it is possible to interpret the radiometric data (see Figure 9.3) as indicating a much higher depositional rate than discussed previously. For example, if one assumes this to be an intact sediment core, then the cesium peak occurs at 30 cm, which would indicate a sediment accumulation rate of greater than 1 cm/year. However, the lack of a cesium horizon, as well as past sediment core investigations would suggest that such a high accumulation rate is unlikely.

Recommendations for the main portion of Cayuga Lake are as follows. *First*, comparison of recent findings to those of several decades ago, indicate that trophic conditions within the main portion of Cayuga Lake have declined somewhat over the past several decades. This trend is generally viewed as a positive development, and nutrient control efforts should be continued within the watershed - particularly within the south lake (see following discussion). *Second*, the sediment core findings from Cayuga Lake are not particularly informative, and given recent concerns regarding hazardous waste site(s) in the southern catchment, it would be prudent to collect at least one additional sediment core from the lake. Given the difficulties encountered during the present study several recommendations are suggested regarding future coring efforts. Sediment core(s) should be collected from deep-water locations (> 100 m) to maximize the likelihood of obtaining intact radiometric profiles (undisturbed sediments). In addition, future sediment core investigations should consider extracting multiple sediment cores. The entire set of cores would not need to be fully analyzed, but preliminary analyses (radiometric dating) could be conducted on several of the cores to determine which of the cores would be most suitable for more extensive chemical evaluation. It might also be informative to consider collecting several sediment cores along the north-south axis of the lake to evaluate longitudinal gradients within the lake. Should an additional sediment core(s) be collected from the lake, it is recommended that PCB analyses focus upon congener analyses as opposed to Aroclor analyses. In addition, methods for mercury analyses should be chosen to achieve acceptable detection levels (at least one order of magnitude below existing sediment quality guidance levels).

South Lake

Water quality conditions within the southern end of Cayuga Lake have been of concern to area residents for several decades. Issues of concern include: (1) permanent closure (in the early 1960s) of a public swimming beach due to water clarity and bacteriological issues, (2) drinking water concerns related to sediments and trihalomethane (THM) precursors, and (3) aesthetic concerns related to algal blooms, macrophyte growth, odors, etc.

As was highlighted in the July 4, 1998 issue of the Ithaca Journal (1998), concerns about the absence of a public beach at the southern end of Cayuga Lake have existed for several decades. Up until the early 1960s, a public bathing beach was operational at the southern end of Cayuga Lake (Stewart Park). However, public records indicate that water quality concerns about the Stewart Park beach increased during the early 1960s. The beach went through a series of temporary closures during the early 1960s due to a combination of limited water clarity and bacteriological concerns. There was also at least one drowning at the beach during this time frame that was, at least in part, attributed to lack of water clarity in the area. The beach was closed permanently after the 1964 swimming season. The viability of reopening a public beach in this area is not known at this time due to a lack of understanding regarding water quality dynamics within this portion of the lake.

There are also concerns regarding THM levels in the regional public water supply (PWS) taken from Cayuga Lake. THMs are a class of organic chemicals formed as a by-product of certain disinfection processes (e.g., chlorination). It is important to note that the disinfection of public water supplies has been an extremely successful public health effort and has greatly reduced the threat of waterborne diseases such as typhoid, cholera, and dysentery. However, chlorination of potable water supplies, which is the primary method of disinfection in use today, also results in the production of undesirable chemical compounds such as THMs. This class of organic compounds has been linked to certain forms of cancers and other adverse health effects. THMs are formed as a result of a chemical reaction(s) between chlorine and natural organic matter (NOM). Several factors play a role in the formation of THMs including the concentration of NOM, the chlorine dosage, and the length of chlorine contact time. The USEPA has issued a *Stage 1 Disinfectant and Disinfection Byproducts Rule* which calls for all public water supply (PWS) systems serving greater than 10,000 people to meet certain criteria related to THMs. The current rule requires that total THMs not exceed 100 ug/l based on a running annual average (EPA, 1999). More stringent requirements are also scheduled for implementation in several years under the Stage 2 rule. The Bolton Point Municipal Water System (BP-MWS), which draws water from Cayuga Lake, is located approximately 4 km (2.5 miles) from the southern end of the lake. Total THM levels in finished water from the BP-MWS ranged from 44-116 ug/l during 1999 (Bolton Point Municipal Water System, 2000). Thus, THM levels are a concern within the BP-MWS. The plant has been investigating methods to reduce THM levels over the past few years (BP-MWS, 2000). However, it is likely that reductions in NOM – via reductions in loadings of sediments and nutrients to the south lake would assist plant managers in controlling THM levels within the water supply system.

Finally, there are also concerns within the southern end of Cayuga Lake relating to aesthetics. Citizen complaints include noxious odors, nuisance algal blooms, and extensive growth of rooted aquatic plants, among other complaints. Levels of concern tend to vary over time due to the natural variations in water quality conditions within the lake. The concerns are believed to stem primarily from issues of cultural eutrophication and sediment dynamics.

Findings from this investigation indicate a substantial gradient in total phosphorus levels from the southern terminus of Cayuga Lake to the main lake site. Mean total phosphorus levels within the south lake were 17.2 ug/l, versus approximately 10 ug/l at the main lake site. Other trophic parameters (chlorophyll *a* and Secchi Disk depth) did not show a similar longitudinal gradient during this study. However, other investigations [Sterns and Wheler, 1997, and UFI, 2000)] have documented such gradients for other trophic parameters - see Table 11.1. These studies also indicate that total phosphorus levels within the south lake regularly exceed the New York State total phosphorus guidance value of 20 ug/l. The UFI study, sponsored by Cornell University as part of its Lake Source Cooling (LSC) permit conditions, provides the best spatial resolution in water quality conditions within the south lake. The UFI study indicates that water quality conditions vary substantially within the south shelf area. In general, findings suggest that trophic indicators tend to be higher (elevated total phosphorus and chlorophyll *a*, and lower water clarity) on the eastern side of the southern shelf than on the western side. This is consistent with predominant circulation patterns that exist in the south-lake which tend to move in a counter-clockwise direction, and thus, carry tributary loads to the eastern side of the lake. Unfortunately, historical records (prior to the mid to late 1990s) for trophic parameters in the south lake are not available, and thus, long-term temporal changes could not be assessed. There is also some indication that Zebra mussels may be influencing water quality conditions within the south-lake and may account for the general trend toward lower levels of phosphorus and chlorophyll a, and increases in water clarity. As discussed earlier, the presence of Zebra mussels can significantly modify aquatic ecosystems due to their efficient filtration of suspended particulate material. While a formal investigation has not been a part of this study, visual observations during the latter half of this investigation indicate significant numbers of young Zebra mussels affixed to aquatic macrophytes within the south-lake (see Figure 5.20).

Table 11.1: Trophic indicator findings from past water quality investigations of Cayuga Lake

	Total P (ug/l)		*Chlorophyll a (ug/l)*		*Secchi Disk (m)*		
Year	*Main Lake*	*S. Lake*	*Main Lake*	*S. Lake*	*Main Lake*	*S. Lake*	*Reference*
1994	22.4	30.8	4.1	8.9	2.1	1.5	Sterns and Wheler, 1997
1995	16.3	23.7	4.8	6.8	2.2	1.7	Sterns and Wheler, 1997
1996	13.2	25.7	3.4	7.6	2.5	1.9	Sterns and Wheler, 1997
1998	14.7	26.5	4.8	5.7	-	-	UFI, 2000
1999	10.6	15.9	4.7	4.4	-	-	UFI, 2000

Note: Station(s) varied between studies

Current use impairments within the south end of Cayuga Lake, coupled with water quality findings from this and other studies, indicate that conditions within the south lake are degraded. However, while it is clear that water quality conditions within the south lake are degraded, current understanding as to the causes of the degradation and water quality dynamics within the south lake are limited. There are significant data gaps within both the south lake and the contributory watershed that need to be more fully defined and understood.

There are several studies underway within the Cayuga Lake watershed that should contribute to a better understanding of water quality issues within the south lake. These efforts include both in-lake activities and watershed activities. In-lake activities include: (1) water column sampling by the Upstate Freshwater Institute (UFI) in association with the Cornell LSC discharge permit and by NYSDEC as part of the Long-term Synoptic Study, and installation of a Robotic Underwater Sampling Station (RUSS) unit and associated hydrodynamic study being conducted by Cornell University. Watershed activities currently underway include event-based monitoring efforts on Six Mile creek being conducted by USGS and the City of Ithaca, planned event-based monitoring of Fall Creek and the Cayuga Inlet by the NYSDEC, and watershed modeling efforts being conducted within the Fall Creek watershed by Cornell.

Beyond the ongoing and planned studies discussed above, several additional measures are recommended for the southern end of Cayuga Lake to more fully characterize water quality dynamics within the south lake. *First*, given the reality of limited resources, it is important that the activities already underway be coordinated to maximize the efficiency and minimize the redundancy of existing studies. This should include regular meetings to discuss study plans, findings, and related topics. *Second*, an effort should be initiated to develop detailed material loading estimates for all three major tributaries to the south lake. This effort will require the collection of water samples in conjunction with flow measurements proximate to the mouths of the three major tributaries to the south-lake. Fortunately, the USGS currently maintains flow gages on all three tributaries. In addition to flow measurements, water samples will need to be collected from the tributaries. At a minimum, sample parameters should include total phosphorus, soluble reactive phosphorus, total suspended solids, and chlorides. Tributary material loads are often dominated by high flow events. Thus, it is essential that water samples be collected across a broad spectrum of hydrologic conditions, and that every effort be made to capture significant *storm events*. Given the importance of capturing storm-events, the study should be conducted over a several year period so as to increase the likelihood of capturing as many high-flow events as possible. *Third*, a deterministic, coupled, watershed/lake mass balance model should be developed for the southern catchment to determine the relative importance of the various forcing conditions within the south lake segment. *Fourth*, a total maximum daily load (TMDL) should be developed to address the various issues of concern within the south lake. This effort should focus on current use impairment issues within this lake segment including preclusion of public swimming beach, THM issues, and aesthetic concerns.

Seneca Lake

Seneca Lake (see Figure 11.5) is the largest of the Finger Lakes with respect to lake volume, and is the second longest of the 11 lakes. The lake itself is situated in Schuyler, Seneca, and Yates County, while the watershed also extends into Chemung and Ontario Counties. Seneca Lake is a multi-use water body and serves as a source of water supply for the City of Geneva and the Villages of Ovid, Waterloo, and Watkins Glen. As with Cayuga Lake, Seneca Lake has several water use classifications ranging from "AA(TS)" within much of the deep basin to "B" at the northern and southern ends of the lake. Seneca Lake is listed on the NYSDEC PWL due to water supply concerns relating to salt levels within the lake.

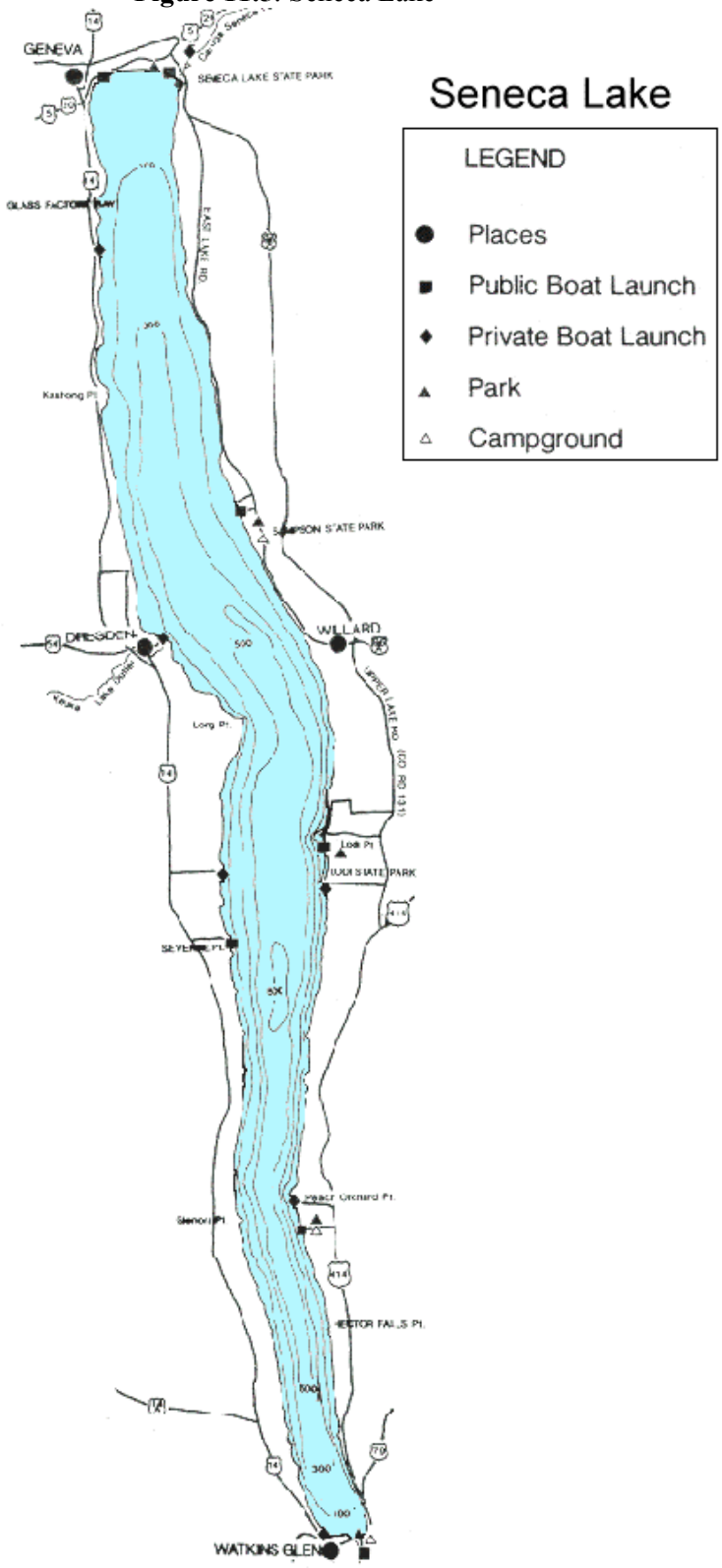
The current trophic state of Seneca Lake is best characterized as borderline between oligotrophic and mesotrophic. The mean total phosphorus concentration, chlorophyll *a* concentration, and Secchi Disk depth recorded during the later 1990s are 9.8 ug/l, 2.4 ug/l, and 6.0 m, respectively. These findings suggest that Seneca Lake has exhibited a significant decline in primary productivity over the past several decades. A comparison of the present findings to those from the early 1970s indicate that total phosphorus levels have declined by approximately 30 percent, while chlorophyll *a* levels have declined by more than three fold. In addition, water clarity levels have approximately doubled during the same time period. The findings for total phosphorus and water clarity are similar in magnitude to those observed in a number of the other large Finger Lakes, however, the decline in chlorophyll *a* levels was significantly larger (on a percentage basis) than that observed in most of the other lakes. While it is likely that nutrient control measures instituted in the intervening time frame could account for the observed changes in total phosphorus levels within the lake, the magnitude of changes observed in water clarity and, particularly, chlorophyll *a* seem unusually large. Other researchers have suggested that the introduction and proliferation of Zebra mussel populations within Seneca Lake has had a dramatic effect on these trophic parameters. This would seem a reasonable hypothesis given the magnitude of change and local observations regarding Zebra mussel increases. As with previous studies, hypolimnetic waters within Seneca Lake appear to remain well oxygenated throughout the growing season. It should be noted, however, that due equipment limitations of this study, vertical profiles from this study were limited to 100 m. Thus, given the significant depths of Seneca Lake, it is not possible to draw conclusions regarding deeper portions of the lake. Major ion trends within Seneca Lake indicate significant *declines* in chloride and sodium levels, and a smaller decline in calcium levels, as well as *increases* in sulfate and alkalinity levels. The marked decline in chloride and sodium levels would appear to call into question the premise that concentrations observed during the 1960s and 1970s were the result of natural conditions associated with the depth of the lake basin – see earlier discussion.

Sediment core findings from Seneca Lake indicate a sediment accumulation rate of 0.23 cm/year. This is in the lower range of sediment accumulation rates observed within the Finger Lakes. *Organic* chemical findings from the Seneca Lake sediment core are limited to DDT and its metabolites, and PCB congeners. Total DDT levels within Seneca Lake appear to have declined significantly over the past several decades (see Figure 9.6). Levels peaked at 153 ppb in approximately 1968. Surficial sediment concentrations of total DDT are 40 ppb, which is above the TEL but substantially below the PEL. Total PCB congener levels observed in the Seneca Lake sediment core are 466 ppb (408 ppb after adjustment for DDE), which is in the upper range of PCB levels observed within the Finger Lakes, and exceed the PEL for total PCBs. These values are from a single core segment taken from 4-6 cm in depth, which is estimated to represent sediments deposited in the late 1970s. The levels of PCBs within the surficial sediments were not evaluated. *Inorganic* chemical findings from the Seneca Lake sediment core are as follows: (a) Arsenic levels within the Seneca Lake sediment core range from 12.3-19.0 ppm, and are either slightly below or slightly above the PEL. The upper sediment layer was above the PEL for arsenic. This tendency toward higher arsenic levels within surficial sediments is apparent in several of the Finger Lakes. As discussed earlier, subsequent water column sampling, albeit limited, failed to detect arsenic (> 10 ug/l) in either the epilimnion or the hypolimnion – see further discussion above; (b) Cadmium levels

range from 1.6-2.2 ppm and are largely constant over the recorded time period. Sediment cadmium levels are above the TEL but below the PEL; (c) Calcium concentrations range from 5,250-37,200 ppm and have increased substantially over the past several decades – there are no guidance values for calcium; (d) Chromium levels range from 26.2-30.1 ppm, and reach a peak in approximately 1970. Surficial sediment concentrations are below the TEL and PEL; (e) Copper levels range from 44.2-61.8 ppm and reach a maximum in about 1970. Surficial sediment concentrations are above the TEL but below the PEL for copper; (f) Lead levels range from 52.6-80.0 ppm and have declined over the past several decades. Lead levels within surficial sediments are above the TEL, but below the PEL; (g) Mercury levels range from 0.1-0.28 ppm and have declined by approximately 50 percent over the past 4 decades. Surficial concentrations are below the TEL and PEL for total mercury; (h) Nickel levels range from 39.9-46.1 ppm and are largely constant over the past half century. Nickel levels are above the TEL but below the PEL; and (i) Zinc levels range from 139-176 ppm and are largely constant over the past half century. Concentrations are above the TEL but below the PEL for zinc.

Recommendations for Seneca Lake are as follows. *First*, study results indicate that nutrient control measures within the Seneca Lake watershed have been quite successful over the past several decades as evidenced by the decline in total phosphorus levels over the intervening time frame. Thus, continued efforts with respect to the control of nutrient inputs to the lake are warranted. *Second*, while trophic conditions within Seneca Lake have "improved" somewhat over the past several decades, the trophic status of the lake is somewhat complicated by the presence of Zebra mussels (and possibly Quagga mussels) within the lake. Thus, it is recommended that a program to quantify Zebra mussel dynamics within Seneca Lake be initiated. *Third*, findings indicate that sodium and chloride levels within Seneca Lake are in decline, however, these observations would suggest that ambient concentrations are originating from other than natural conditions. Previous investigations have concluded that the elevated levels of sodium and chloride within Seneca Lake are the result of the intersection of the lake basin with salt strata. However, if this were the case one would expect the level of these ions to remain relatively static. The observation that levels are changing would seem to warrant additional study as to the cause(s) of the observed changes. *Fourth*, PCB findings from the Seneca Lake sediment core indicate that total PCB levels exceed the PEL. There have also been indications that PCB levels in certain sport fish are elevated (although, not above current FDA action levels). These findings warrant continued monitoring of biota for PCB levels in the future. *Fifth*, although surficial sediments in Seneca Lake do not exhibit a significant up-tick in arsenic levels as observed in several of the other Finger Lakes, arsenic levels within the sediments of Seneca Lake are fairly high – surficial concentrations exceed the PEL. Thus, additional investigation is warranted regarding: (a) source(s) of arsenic within the Seneca Lake benthic sediments, and (b) environmental cycling and availability of arsenic. *Sixth*, as with a number of the Finger Lakes, nickel concentrations within Seneca Lake sediments are elevated. Thus, additional study of the origin(s) and possible environmental effects of nickel levels may be warranted.

Figure 11.5: Seneca Lake



Not intended for navigation purposes.

Keuka Lake

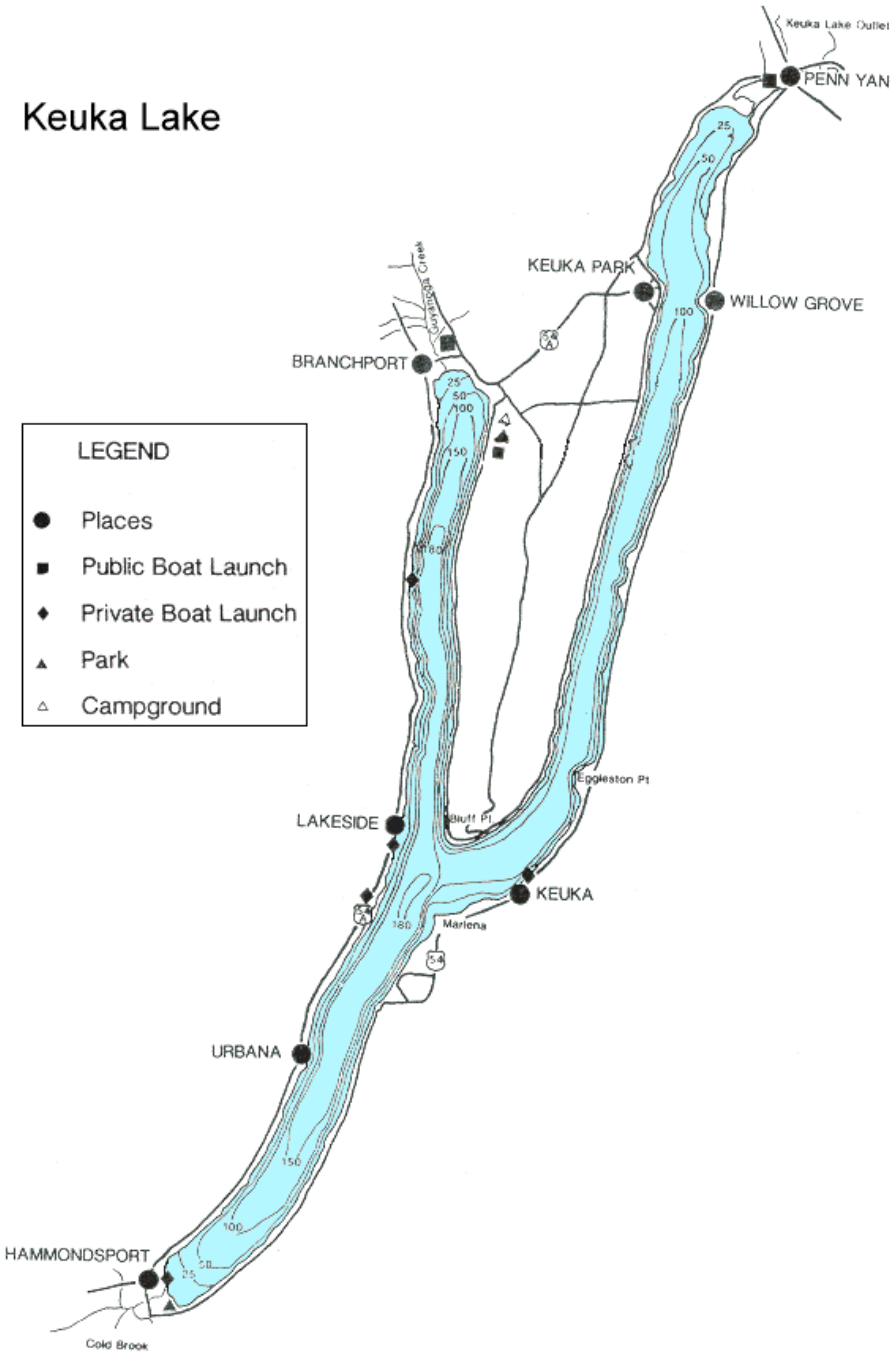
Keuka Lake (see Figure 11.6) is readily distinguishable from the other 11 Finger Lakes due to the characteristic "Y" shaped of the lake basin. The lake and watershed are situated in Steuben and Yates Counties. The lake is a multi-purpose waterbody, and serves as a source of water supply for the Villages of Hammondsport and Penn Yan. Keuka Lake has a water use classification of "AA(TS)", and is listed on the NYSDEC PWL list due to a fish consumption advisory relating to DDT and its metabolites.

The current trophic state of Keuka Lake is best characterized as borderline between oligotrophic and mesotrophic. The mean total phosphorus concentration, chlorophyll *a* concentration, and Secchi Disk depth measured during the later 1990s are 8.0 ug/l, 2.8 ug/l, and 5.6 m, respectively. These finding indicate that trophic conditions within Keuka Lake have declined substantially over the last several decades. A comparison of the present findings to those from the early 1970s indicate that total phosphorus levels and chlorophyll *a* levels have declined by approximately 40 percent. In addition, water clarity levels increased by approximately 15 percent. Furthermore, as has been the case historically, the water column of Keuka Lake remains well oxygenated during the growing season. Major ion trends within Keuka Lake over the past several decades indicate *declines* in magnesium and sulfate levels, and *increases* in calcium, sodium, chloride, and alkalinity levels.

Sediment core findings from Keuka Lake indicate a sediment accumulation rate of 0.37 cm/year, which is in the middle range of sediment accumulation rates within the Finger Lakes. *Organic* chemical findings for Keuka Lake are limited to DDT and its metabolites, and total PCBs. Total DDT levels within the sediments of Keuka Lake have decline markedly over the last several decades, from a peak of nearly 400 ppb in the late 1970s to current levels of 72 ppb (as measured in surficial sediments). This decline is consistent with findings for fish flesh analyses from the lake. While the DDT trends are encouraging, DDT levels remain above the TEL, however, they are below the PEL. Total PCBs were measured from a single sediment core segment taken from Keuka Lake. The core segment represents sediments deposited in the mid 1980s, and measured 449 ppb or 289 ppb when adjusted for DDE levels. The later value is probably more accurate given historical DDT levels within the lake. Thus, total PCB levels within Keuka Lake are in the middle range of PCB concentrations measured in Finger Lakes sediments, and are above the TEL and PEL for total PCBs. Fish flesh data from the mid 1980s showed limited elevation in Aroclors 1254 and 1260 (from below detection to 0.288 ppm) – the current FDA action level for PCBs is 5 ppm. *Inorganic* chemical findings for Keuka Lake indicate a marked increase in arsenic and manganese concentrations in the upper sediments of the lake. This pattern is also apparent in several other Finger Lakes cores. Arsenic and manganese levels within Keuka Lake sediments range from 15.4-47.1 ppm and 1,360-5,650 ppm, respectively. The cause(s) of the surficial sediment enrichment in arsenic and manganese is not certain – see discussion in Chapter 9. The arsenic levels detected in the upper sediment layers of Keuka Lake exceed both the TEL and PEL. As indicated earlier, subsequent water column monitoring conducted during 1999, albeit limited, did not detect arsenic (at > 10 ppb) within the water column (epilimnion or hypolimnion) – see further discussion above. Additional inorganic findings from the Keuka Lake sediment core investigation are as follows: (a) Calcium levels range from 2,160-3,680 ppm and are fairly constant over time, which stands in contrast to many of the other Finger Lakes, which have shown marked increases in calcium concentrations over the past several decades; (b) Chromium levels range from 26.7-30.2 ppm and reach maximum levels in approximately 1960. Surficial sediment chromium levels are below both the TEL and PEL; (c) Copper levels range from 37.3-45.1 ppm and peak in the mid-1980s. Copper concentrations in surficial sediments exceed the TEL but are below the PEL; (d) Lead levels range from 36.1-69.4 ppm and have declined substantially since a peak in the mid 1960s. However, lead concentrations in surficial sediments remain above the TEL, but below the PEL; (e) Nickel levels range from 42.5-50.3 ppm and remain fairly constant over time, however, levels exceed both the TEL and PEL for nickel; (f) Zinc levels range from 128-168 ppm and are fairly constant over the documented time interval, with surficial sediments exceeding the TEL but below the PEL.

Recommendations for Keuka Lake are as follows. *First*, Keuka Lake has exhibited a substantial reduction in productivity levels over the past several decades as evidenced by changes in the levels of trophic indicators. These changes, which are generally viewed as a positive development, are most likely the result of nutrient control measures implemented over the last several decades. Thus, it is recommended that efforts to control nutrient releases within the watershed be continued. *Second*, DDT findings indicate a substantial decline in total DDT levels within the sediments of Keuka Lake over the past several decades. However, DDT levels remain relatively high within surficial sediment layers. Thus, continued monitoring of DDT levels in biota (e.g., fish) within the lake is advisable. *Third*, PCB findings from the Keuka Lake sediment core indicate some elevation in PCB levels within the Lake. However, past analyses of fish tissue do not indicate significant PCB levels within sport fish. Given these somewhat conflicting findings, it is advisable to continue PCB analyses within sport fish in conjunction with DDT analyses discussed above. *Fourth*, as with several of the Finger Lakes, sediment core findings from Keuka Lake show a marked enrichment in arsenic and manganese within surficial sediments. Water column sampling within Keuka Lake, subsequent to the core findings, failed to show detectable levels of arsenic in the water column of Keuka Lake. However, these water column findings should be considered preliminary due to the limited scope of sampling (both spacially and temporally) and the analytical detection levels of the methods employed. Thus, additional study of arsenic and manganese within the watershed is warranted – the focus of future study should include efforts to determine the cause(s) of the observed arsenic and manganese enrichment, and further evaluation of possible human exposure and/or environmental effects of the arsenic levels observed. *Fifth*, elevated nickel levels were also observed within the sediments of Keuka Lake. Assessment of possible sources of nickel to the watershed and the environmental implications of the levels observed is warranted. *Sixth*, as with the other Finger Lakes, it is recommended that a Zebra mussel monitoring program be initiated on Keuka Lake. The study should include an examination of Zebra mussel population dynamics within the lake, and an assessment of possible ecological effects resulting from their presence.

Figure 11.6: Keuka Lake



Not intended for navigation purposes.

Canandaigua Lake

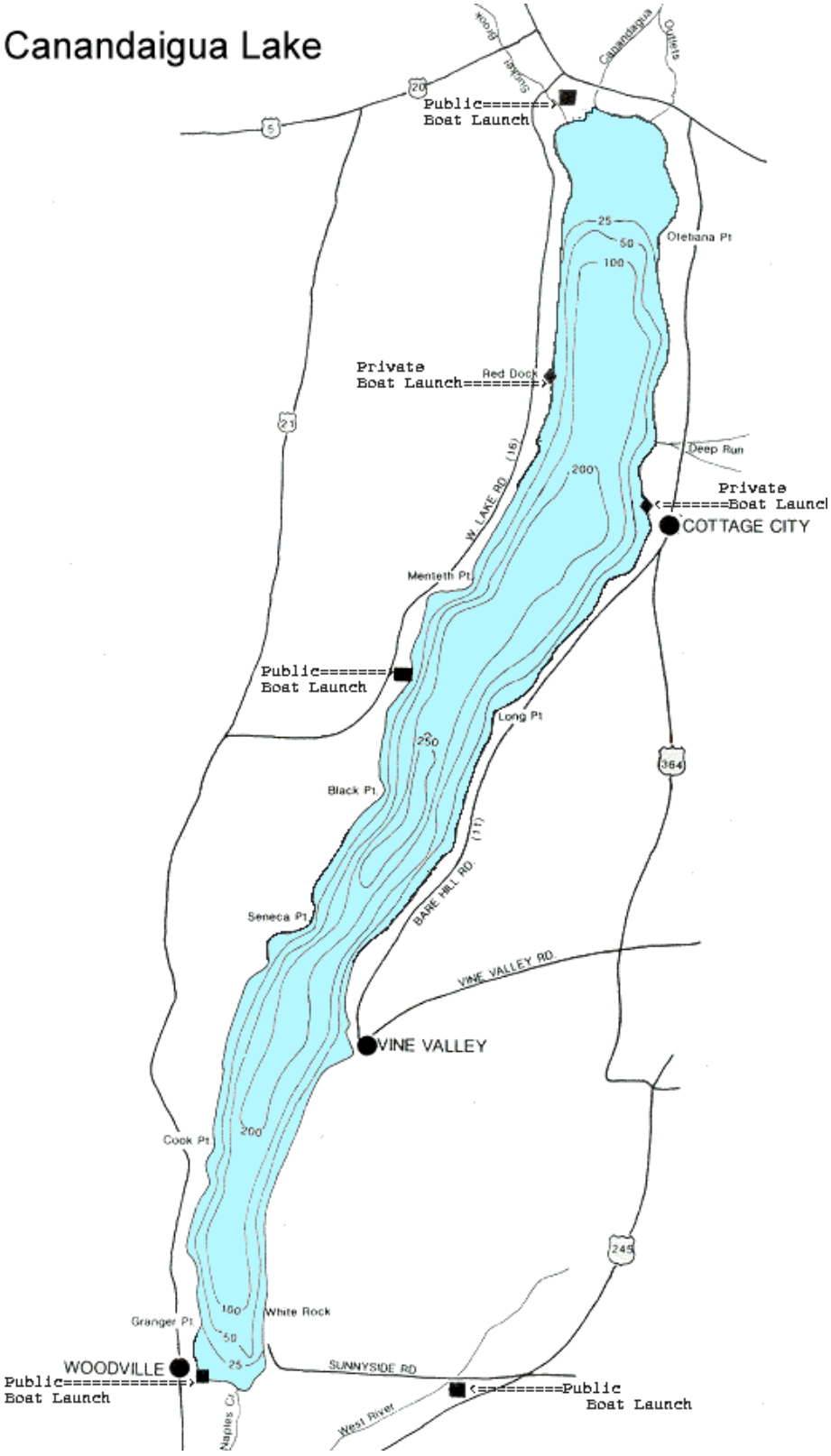
Canandiagua Lake (see Figure 11.7) is one of the six larger Finger Lakes. The lake is within Ontario and Yates Counties, while the watershed also extends into Livingston and Steuben Counties. Canandaigua Lake is a multi-purpose lake and serves as a source of water supply for the City of Canandaigua, and the Villages of Bristol Harbor, Gorham, Newark, Palmyra, and Rushville. The lake has a water use classification of "AA(TS)", and is listed on the NYSDEC PWL due to a fish consumption advisory relating to PCBs.

The current trophic level of Canandaigua Lake is best characterized as oligotrophic, as evidenced by the current level of trophic indicators. The mean total phosphorus concentration, chlorophyll *a* concentration, and Secchi Disk depth measured during the later 1990s are 8.0 ug/l, 2.8 ug/l, and 5.6 m, respectively. These finding indicate that trophic conditions within Canandaigua Lake have declined substantially over the last several decades. A comparison of the present findings to those from the early 1970s indicate that total phosphorus levels and chlorophyll *a* levels have declined by approximately 40-50 percent. In addition, water clarity levels increased by approximately 50 percent. Furthermore, as has been the case historically, the water column of Canandaigua Lake remains well oxygenated during the growing season. Trends for major ions within Canandaigua Lake over the past several decades indicate *declines* in magnesium and sulfate levels, and *increases* in sodium, chloride, and alkalinity concentrations.

Sediment core findings from Canandaigua Lake indicate a sediment accumulation rate of approximately 0.2 cm/year, which is in the lower range of depositional rates observed within the Finger Lakes. *Organic* chemical findings for Canandaigua Lake are limited to DDT and its metabolites. Total DDT levels within the sediments of Canandaigua Lake have declined markedly over the last several decades, from a peak of slightly more than 200 ppb in the early 1960s to current levels of less than 20 ppb (as measured in surficial sediments). The total DDT levels measured in the upper sediments are below the PEL and only slightly above the TEL for total DDT. Unfortunately, total PCB levels for the Canandaigua Lake core were not analyzed due to a study oversight. *Inorganic* chemical findings for Canandaigua Lake indicate a marked increase in arsenic and manganese concentrations in the upper sediment layer of the lake. As discussed above, this pattern is also apparent in several other Finger Lakes cores. Arsenic and manganese levels range from 13.8-45.0 ppm and 1,050-4,960 ppm in Canandaigua Lake sediments, respectively. The cause(s) of the surficial sediment enrichment in arsenic and manganese is not certain – see discussion in Chapter 9. The arsenic levels detected in the upper sediment layers of Canandaigua Lake exceed both the TEL and PEL. Subsequent water column monitoring conducted during 1999, albeit limited, did not detect arsenic (at > 10 ppb) within the water column of Canandaigua Lake – see further discussion above. Additional inorganic findings from the Canandaigua Lake sediment core investigation are as follows: (a) Calcium levels range from 6,660-18,900 ppm within the sediments of Canandaigua Lake and are somewhat atypical, in that while the core exhibits a substantial increase in calcium levels from the 1960s to the 1970s, it also exhibits higher calcium levels prior to the 1940s. This "U" shaped pattern in sediment calcium levels is unique within the Finger Lakes; (b) Chromium levels range from 24.1-27.6 ppm and remain fairly constant over time. The surficial sediment chromium concentration is below both the TEL and PEL; (c) Copper levels range from 33.1-42.2 ppm and are fairly uniform over the recorded time period. The surficial sediment copper concentration is below both the TEL and PEL for copper; (d) Lead levels range from 34.2-70.4 ppm and have declined substantially since the early to mid-1960s. However, lead concentrations in surficial sediments remain above the TEL, although they are below the PEL; (e) Nickel levels range from 45.1-49.5 ppm and are fairly constant over time, however, levels exceed both the TEL and PEL for nickel; (f) Zinc levels range from 133-173 ppm and appear fairly constant over the documented time interval, with surficial sediments exceeding the TEL but below the PEL.

Recommendations for Canandaigua Lake are as follows. *First*, it is likely that nutrient control measures over the past several decades have contributed to a significant reduction in trophic conditions within the lake – this is generally interpreted as a positive development. Thus, efforts to control the input of nutrients (particularly phosphorus) to the lake should be continued in the future. *Second*, while it is probable that nutrient control measures are responsible for a significant portion of the reduction in primary productivity, there are also indications that Zebra mussels may be influencing trophic conditions within Canandaigua Lake. The presence of Zebra mussels within the lake could have significant ecological consequences for the lake. Thus, as with the other Finger Lakes, it is recommended that a Zebra mussel monitoring program be initiated on Canandaigua Lake. The study should include an examination of Zebra mussel population dynamics within the lake, and an assessment of possible ecological effects resulting from their presence. *Third*, as with many of the Finger Lakes, chloride and sodium levels within Canandaigua Lake have increased over the past several decades. Thus, efforts to control the use and release of salt within the watershed should be implemented. *Fourth*, while sediment core PCB results are not available for Canandiagua Lake due to a study oversight, it would be prudent to continue monitoring biota for chlorinated organic compounds, given past findings. *Fifth*, as with several of the Finger Lakes, arsenic enrichment was evident in the surficial sediments of Canandaigua Lake. Additional investigation concerning the cause(s) of the observed enrichment, and possible environmental consequences of these findings is warranted. *Sixth*, as with several of the Finger Lakes, nickel levels within the sediments of Canandaigua Lake are above the TEL and PEL. Additional investigation as to the origins and possible ecological consequences of these nickel levels is warranted.

Figure 11.7: Canandaigua Lake

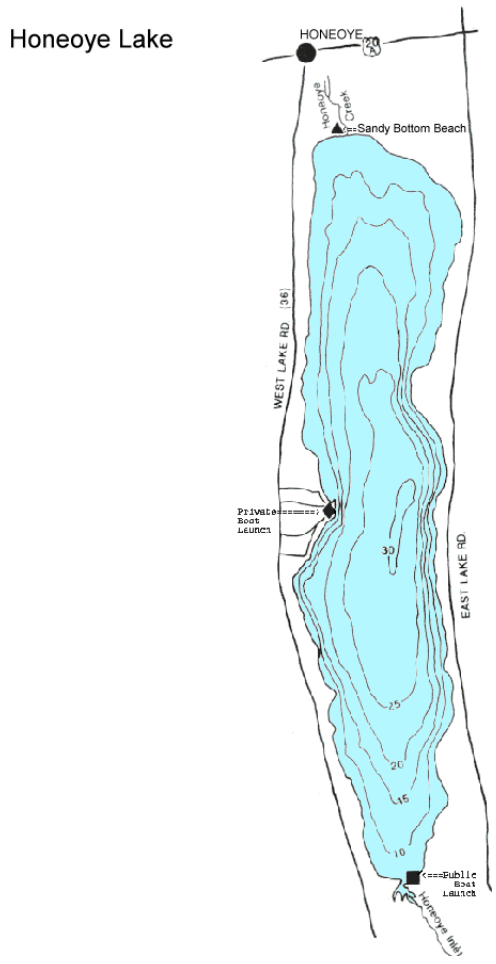


Not intended for navigation purposes.

Honeoye Lake

Honeoye Lake (see Figure 11.8) is one of the smaller Finger Lakes, and has the smallest volume and average depth of any of the lakes. The lake and watershed are located in Ontario County. Honeoye Lake is a multi-purpose lake, and is the only one of the Finger Lakes not currently used as a source of public water supply. However, the lake has a water use classification of "AA", and likely serves as a water supply for individual home owners around the lake. Honeoye Lake is currently listed on the NYSDEC PWL due to water supply concerns relating to nutrients.

Figure 11.8: Honeoye Lake



The current trophic level of Honeoye Lake is best characterized as eutrophic, as evidenced by existing levels of major trophic indicators. The mean epilimnetic total phosphorus concentration, chlorophyll *a* concentration, and Secchi Disk depth measured during the later 1990s are 24.2 ug/l, 8.4 ug/l, and 3.7 m, respectively. While the trophic level of Honeoye Lake remains similar to that of the early 1970s, the levels of major trophic indicators are considerably different from those observed in the early 1070s. Findings from the early 1970s show mean levels of total phosphorus, chlorophyll *a*, and Secchi Disk depth of 19 ug/l, 25.7 ug/l, and 3.0 m, respectively. Thus, total phosphorus levels have increased, chlorophyll *a* levels have declined, and Secchi Disk depth has apparently increased. The hypolimnion of Honeoye Lake frequently becomes hypoxic during the growing season. The cause(s) and/or consequences of this dissolved oxygen depletion are uncertain. For example, while dissolved oxygen depletion is, no doubt, a consequence of both natural and human-related processes, the relative importance of the two factors is unclear. Trends for major ions within Honeoye Lake indicate an *increase* in calcium, chloride, sodium, and alkalinity levels, and a *decrease* in sulfate and magnesium levels.

Sediment core findings from Honeoye Lake indicate a sediment accumulation rate of approximately 0.5 cm/year, which is on the high end of accumulation rates observed within the Finger Lakes. *Organic* chemical findings from the Honeoye Lake sediment core are limited to PCB congeners from a single sediment core segment (3-6 cm – approximately 1990). The total PCB concentration from this core segment is 69 ppb, which is on the low end of total PCB levels observed in the Finger Lakes. This is above the TEL for total PCBs, but below the PEL. *Inorganic* chemical findings from the Honeoye Lake sediment core are as follows: (a) Arsenic levels range from 7.4-19.4 ppm, and exhibit an increase in concentration during the 1970s, with a plateau thereafter. Surficial sediment arsenic concentrations are above the TEL and slightly above the PEL. Sediment arsenic enrichment is apparent in a number of the Finger Lakes cores, and the cause(s) of the arsenic enrichment is not certain at this juncture – see discussion in Chapter 9. Subsequent water column monitoring conducted during 1999, albeit limited, did not detect arsenic (at > 10 ppb) within the water column of Honeoye Lake – see further discussion above. (b) Chromium levels range from 25.4-32.5 ppm and remain fairly constant over time. Chromium levels

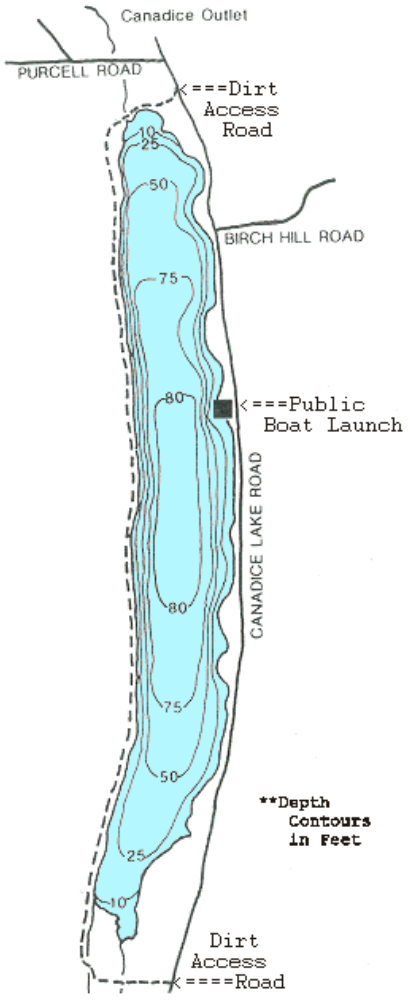
are below both TEL and PEL; (c) Copper levels range from 24.6-44.8 ppm and remain fairly constant over time. Copper levels are below TEL and PEL levels; (d) Lead levels range from 32.2-62.9 ppm and show a decline from the early 1970s until approximately 1990, but appear to have increased of late. This apparent increase is based on a single core segment. However, the observed rate of decline in lead levels in Honeoye Lake from the 1970s to the 1990s (see Figure 9.17) is somewhat less pronounced than observed in several other Finger Lakes. Thus, it is possible that there is a relatively "new" source of lead within the watershed. The lead level within the surficial sediment layer is above the TEL, but below the PEL; (e) Manganese levels range from 661-2,410 ppm and exhibit a significant increase in concentration over time; (f) Nickel levels range from 44.1-58.4 ppm and remain fairly constant over the recorded time interval. Nickel levels are above the TEL and PEL; (g) Zinc levels range from 121-170 ppm and also remain fairly constant over much of the recorded time interval, however, a moderate increase in concentrations is apparent in the surficial sediment layer. Zinc concentrations are above the TEL, but below the PEL.

Recommendations for Honeoye Lake are as follows. *First*, total phosphorus levels observed within Honeoye Lake are above the current New York State guidance value for total phosphorus. In addition, hypoxic conditions occur within the hypolimnion of the lake on a seasonal basis. Thus, it is important that nutrient control measures within the watershed be enhanced. This should include an assessment of nutrient loading to the lake and an evaluation of permitted loads. Furthermore, as with several of the smaller Finger Lakes, nutrient dynamics within Honeoye Lake are not fully understood. Therefore, it is suggested that additional study of nutrient dynamics within Honeoye Lake be conducted. The focus of such a study should be to more fully define both external and internal inputs of nutrients to the lake. *Second*, the presence of Zebra mussels has been documented within Honeoye Lake. Zebra mussels are believed to be having significant ecological effects on several of the Finger Lakes. Thus, a Zebra mussel monitoring program is recommended for Honeoye Lake. *Third*, as with many of the Finger Lakes, chloride and sodium levels have increased over the past several decades. Thus, efforts to control the use and release of salt within the watershed should be encouraged. *Fourth*, as with several of the Finger Lakes, arsenic levels within the sediments of Honeoye Lake have increased of late. Thus, efforts to understand the cause(s) and possible environmental consequences of the observed increases in arsenic is suggested. *Fifth*, as with several of the Finger Lakes, nickel levels within the sediments of Honeoye Lake are above the TEL and PEL. Additional investigation as to the origins and possible ecological consequences of these nickel levels is warranted.

Canadice Lake

Canadice Lake (see Figure 11.9) is one of the five smaller Finger Lakes, and has the smallest surface area and drainage area of any of the lakes. The lake is located in Ontario County, while its watershed also extends into Livingston County. Canadice Lake is primarily used for water supply by the City of Rochester. The lake has a water use classification of "AA", and has fairly stringent watershed protection measures in place. Canadice Lake is listed on the NYSDEC PWL due to a fish consumption advisory related to PCBs.

Figure 11.9: Canadice Lake



Not intended for navigation purposes.

The trophic state of Canadice Lake is best characterized as borderline between oligotrophic and mesotrophic. The mean epilimnetic levels for major trophic indicators during the late 1990s are 8.3 ug/l, 2.5 ug/l, and 5.0 m, for total phosphorus, chlorophyll *a*, and Secchi Disk depth, respectively. These findings indicate a slight reduction in trophic conditions within Canadice Lake over the past several decades. The hypolimnion of Canadice Lake becomes hypoxic/anoxic during the mid to late summer. Dissolved oxygen levels drop below 1 mg/l within portions of the hypolimnion for sustained periods of time. The cause(s) and/or consequences of this dissolved oxygen depletion are uncertain. For example, while dissolved oxygen depletion is obviously a consequence of both natural and human-related processes, the relative importance of the two factors is unclear. Trends for major ions within Canadice Lake indicate an *increase* in the concentration of calcium, chloride, and sodium, and a *decrease* in sulfate and magnesium levels. In addition, there appears to be a slight decline in alkalinity levels.

Sediment core findings from Canadice Lake indicate a sediment accumulation rate of approximately 0.2 cm/year. This is one of the lowest accumulation rates observed within the Finger Lakes. *Organic* chemical findings for Canadice Lake are limited to DDT and its metabolites, and PCBs. DDT results from the Canadice Lake sediment core are fairly limited – most core segments were below detectable levels for DDT and its metabolites. However, two core segments did show detectable levels of the metabolites DDE and DDD. These findings indicate that levels of these chemicals have declined over the past several decades within Canadice Lake. PCB findings from the Canadice Lake sediment core are also quite limited. Study results did show discernable levels of Aroclor 1254 within the 2-4 cm sediment segment (mid 1980s). PCB congeners, analyzed from the 4-6 cm sediment segment (early 1970s), indicated a total PCB concentration of 352 ppb. This is in the middle range of levels observed in other Finger Lakes cores. One unexpected finding worth noting in the Canadice Lake core is that the congener pattern observed in the 4-6 cm section (Aroclor 1242) is different from both the fish flesh pattern observed during the past decade, or so, and from the pattern observed in the core segment immediately above (2-4 cm) which was considered consistent with higher chlorinated Aroclor compounds (Aroclor 1254 and/or 1260). *Inorganic* chemical findings from the Canadice Lake sediment core indicate a significant increase in arsenic and manganese levels over the past several decades. This phenomenon of arsenic and manganese enrichment within upper sediment layers is also apparent in a number of the other Finger Lakes. Arsenic and manganese levels within Canadice Lake

sediments range from 10.4-29.3 ppm and 712-1,800 ppm, respectively. The cause(s) of the arsenic and manganese enrichment in surficial sediments is not certain – see discussion in Chapter 9. The arsenic levels observed in the surficial sediments of Canadice Lake are above the TEL and PEL. Subsequent water column monitoring conducted during 1999, albeit limited, did not detect arsenic (at > 10 ppb) within the water column (epilimnion or hypolimnion) of Canadice Lake – see further discussion above. Additional inorganic chemical findings for the Canadice Lake core are as follows: (a) Calcium levels range from 1,500-2,540 ppm and have increased substantially over the past several decades. This pattern is present in many of the Finger Lakes; (b) Chromium levels range from 21.4-28.6 ppm and appear fairly stable over time. Chromium levels are below the TEL and PEL; (c) Copper levels range from 31.1-45.9 ppm and are fairly stable over time, however, levels show a spike in the early 1980s and a subsequent drop in the early 1990s. Copper levels are near the TEL but below the PEL; (d) Lead levels range from 25.6-64.2 ppm and exhibit a marked decline following a peak in the mid-1970s. Lead levels within surficial sediments are very close to the TEL; (e) Nickel levels range from 38.4-48.4 ppm and are fairly constant over time, however, there would appear to be a downward trend in the last decade. Nickel levels within the surficial sediments are above the TEL and slightly above the PEL; (f) Zinc levels range from 123-180 ppm and parallel the patterns observed for nickel, with fairly uniform levels until the last decade and then a slight decline. Zinc levels are above the TEL but below the PEL.

Recommendations for Canadice Lake are as follows. *First*, trophic conditions within Canadice Lake appear to have declined slightly over the past several decades – this is generally considered a positive development. It is recommended that nutrient control measures be continued within the watershed. *Second*, dissolved oxygen levels within the hypolimnion of the lake are reduced to fairly low levels during much of the growing season. The reasons for this dissolved oxygen depletion are not certain, and additional study of this phenomenon is recommended. The focus of future study should be directed at investigation of the cause(s) of the observed depletion, and possible ecological implications of these hypoxic conditions. *Third*, it is unclear, at this time, whether or not Zebra mussels are established in Canadice Lake. However, the presence of Zebra mussels has been confirmed in all of the other Finger Lakes. Thus, a Zebra mussel monitoring program should be initiated for Canadice Lake. This study should attempt to determine if Zebra mussels are present in the lake, and what ecological effects are occurring, or likely to occur, given colonization. The issue of water column calcium levels should be a component of the Canadice Lake study given the apparent increase in calcium levels within the lake and the importance of calcium levels in Zebra mussel ecology. *Fourth*, as with many of the other Finger Lakes, chloride and sodium levels have increased within Canadice Lake over the past several decades. Thus, it is recommended that measures to control the use and storage of salt within the watershed be implemented. *Fifth*, while PCB levels have declined in certain species of fish over the past several years, monitoring of biota for PCB levels is still warranted. *Sixth*, as with several of the Finger Lakes, arsenic levels within Canadice Lake have increased over the past several decades. Thus, additional study of the cause(s) and possible environmental effects of these increases is recommended. *Seventh*, as with many of the Finger Lakes, nickel levels within the sediments of Canadice Lake appear fairly high. Investigation of the cause(s) and possible environmental consequences of these nickel levels is recommended.

Hemlock Lake

Hemlock Lake (see Figure 11.10) is one of the five smaller Finger Lakes. The lake is located in Livingston County, while the watershed also extends into Ontario County. Hemlock Lake is used primarily as a water supply by the City of Rochester. The lake has a water use classification of "AA(T)", and has fairly stringent watershed protection measures in place. Hemlock Lake is listed on the NYSDEC PWL due to water supply concerns relating to hydrologic modification.

The trophic state of Hemlock Lake is best characterized as between oligotrophic and mesotrophic. The mean epilimnetic levels for major trophic indicators during the late 1990s are 10.0 ug/l, 3.0 ug/l, and 4.7 m, for total phosphorus, chlorophyll *a*, and Secchi Disk depth, respectively. These findings indicate a significant reduction in chlorophyll *a* levels and a significant increase in water clarity within Hemlock Lake over the past several decades. However, total phosphorus levels remain approximately the same as was found in the early 1970s. The hypolimnion of Hemlock Lake becomes hypoxic during the mid to late summer, with dissolved oxygen levels as low as 1 mg/l in certain deep-water locations. The cause(s) and/or consequences of this dissolved oxygen depletion are uncertain. While hypolimnetic dissolved oxygen depletion is obviously a consequence of both natural and human-related processes, the relative importance of the two factors is unclear. Trends for major ions within Hemlock Lake indicate an *increase* in the concentration of calcium, chloride, and sodium, and a *decrease* in sulfate, and magnesium levels.

Sediment core findings from Hemlock Lake were not particularly informative, due to the lack of an intact radiometric profile. Thus, no sediment accumulation rate could be determined for the lake, and chemical results can only be viewed as composite values (no temporal or trend information is available). *Organic* chemical findings for Hemlock Lake are limited to DDT and its metabolites, and PCBs. Total DDT levels within the Hemlock Lake sediment core ranged from 25-49 ppb. As discussed previously, the sediment core from Hemlock Lake appears to have been disturbed, therefore, temporal trends for DDT are not possible. However, ratios of DDT to its metabolites (DDD & DDE) indicate that the signal in Hemlock Lake is fairly weathered – in fact, DDT itself is below detection within the sediment core, and there are only detectable levels of DDD and DDE. This would appear to indicate that the source(s) of these chemicals within the watershed stem from historical releases within the basin. PCB findings from the Hemlock Lake sediment core are also quite limited. PCB congeners, analyzed from the 4-6 cm sediment segment (early 1970s), indicate a total PCB concentration of 67 ppb. This is in the low range of levels observed in other Finger Lakes cores, and is above the TEL, but below the PEL for total PCBs. *Inorganic* chemical findings for Hemlock Lake indicate that sediment arsenic levels are above the TEL and PEL. Arsenic levels range from 13.5-21.4 ppm, with a concentration of 21.4 within the surficial sediment layer. Sediment arsenic enrichment is apparent in a number of the Finger Lakes, and the cause(s) of the arsenic enrichment is not certain – see discussion in Chapter 9. Subsequent water column monitoring conducted during 1999, albeit limited, did not detect arsenic (at > 10 ppb) within the water column of Hemlock Lake – see further discussion above. Additional inorganic chemical findings from the Hemlock Lake sediment core are as follows: (a) Chromium levels range from 27-30.5 ppm – these levels are below the TEL and PEL; (b) Copper levels within the sediments of Hemlock Lake range from 39.6-49.8 ppm, which is above the TEL but below the PEL; (c) Lead levels range from 40.7-52.5 ppm, and show little variation within the core. The lack of a pronounced decline in lead levels within the Hemlock Lake sediment core, which stands in contrast to observations in a number of the other Finger Lakes cores, reinforces the idea that the Hemlock Lake sediments had been disturbed. The observed levels of lead are above the TEL but below the PEL; (d) Nickel levels range from 48.0-57.6 ppm, which is above the TEL and PEL for nickel; and (e) Zinc levels range from 136-155 ppm, which is above the TEL but below the PEL for zinc.

Recommendations for Hemlock Lake are as follows. *First*, trophic conditions within Hemlock Lake have declined significantly over the past several decades with respect to chlorophyll *a* and water clarity – this is generally considered a positive development. However, similar declines in total phosphorus levels are not apparent. In spite of this apparent disconnect in trophic indicators, continued efforts to control the release of nutrients within the watershed are recommended. *Second*, dissolved oxygen levels within the hypolimnion of the lake declined significantly during much of the growing season. The reasons for this dissolved oxygen depletion are not certain, and additional study of this phenomenon is recommended. The focus of future study should be directed at investigation of cause(s) of the observed depletion, and possible ecological implications of these hypoxic conditions. *Third*, the presence of Zebra mussels has been confirmed within Hemlock Lake. Zebra mussels can have profound effects on the ecosystem of a lake, and can result in significant problems for water intake systems. Thus, a Zebra mussel monitoring program should be initiated for Hemlock Lake. This study should focus upon Zebra mussel population trends, and possible ecological effects. *Fourth*, as with many of the Finger Lakes, chloride and sodium levels have increased within Hemlock Lake over the past several decades. Thus, it is recommended that measures to control the use and storage of salt within the watershed be implemented. *Fifth*, as with several of the Finger Lakes, sediment arsenic levels within Hemlock Lake have increased in recent decades. Thus, additional study of the cause(s) and possible environmental effects of these increases is recommended. *Sixth*, as with many of the Finger Lakes, nickel levels within the sediments of Hemlock Lake appear fairly high. Investigation of the cause(s) and possible environmental consequences of these nickel levels is recommended. *Seventh*, it would be informative to collect an additional sediment core from Hemlock Lake for the purposes of establishing a sediment accumulation rate and chemical chronology for the lake.

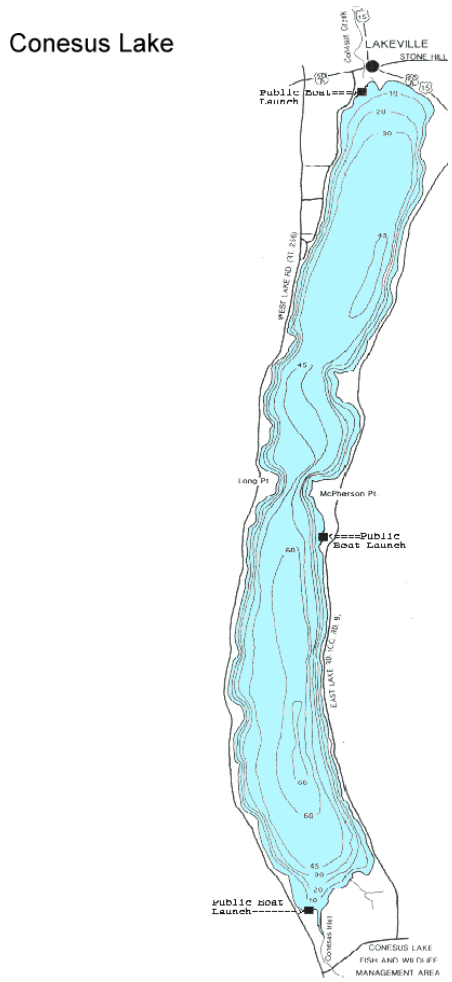
Figure 11.10: Hemlock Lake

Not intended for navigation purposes.

Conesus Lake

Conesus Lake (see Figure 11.11) is one of the five smaller Finger Lakes. The lake and watershed are located in Livingston County. Conesus Lake is a multi-purpose water body, and is used as a source of water supply by the Town of Livonia, and the Villages of Avon and Geneseo. The lake has a water use classification of "AA", and is listed on the NYSDEC PWL due to swimming concerns relating to macrophytes and nutrients.

Figure 11.11: Conesus Lake



Not intended for navigation purposes.

The current trophic state of Conesus Lake is best characterized as eutrophic. The mean epilimnetic levels for major trophic indicators during the late 1990s are 22.2 ug/l, 7.9 ug/l, and 3.7 m, for total phosphorus, chlorophyll *a*, and Secchi Disk depth, respectively. These findings indicate that trophic conditions within Conesus Lake have increased somewhat since the early 1970s – this is generally considered undesirable. The annual mean total phosphorus level has increased slightly and is above the New York State total phosphorus guidance level of 20 ug/l, and water clarity has declined moderately. Furthermore, the hypolimnion of Hemlock Lake becomes anoxic during mid to late summer, with dissolved oxygen levels dropping to near zero in a significant portion of the hypolimnion. The cause(s) and/or consequences of this dissolved oxygen depletion are uncertain. While hypolimnetic dissolved oxygen depletion is obviously a consequence of both natural and human-related processes, the relative importance of the two factors is unclear. Trends for major ions within Conesus Lake indicate an *increase* in the concentration of sodium, and a *decline* in calcium, magnesium, sulfate, and alkalinity levels.

Sediment core findings from Conesus Lake indicate a sediment accumulation rate of approximately 0.4 cm/year, which is in the mid to upper range of accumulation rates observed in the Finger Lakes. *Organic* chemical findings for Conesus Lake are limited to DDT and its metabolites, and PCB congeners. Total DDT (sum of DDT and its metabolites) findings for Conesus Lake are somewhat puzzling. Total DDT levels within the sediments of Conesus Lake show that peak levels occurred in the early 1960s and then decline somewhat by the early 1970s. Since the 1970s, levels appear to have reached a plateau. This might indicate a continuing influx of DDT and/or its metabolites to the lake. However, the chemical signal is composed of only DDD and DDE, which is generally an indication of historical inputs, as opposed to recent inputs, of the parent product (DDT) to the basin. The total DDT levels observed are above the TEL but below the PEL. PCB findings for Conesus Lake are limited to a single sediment core segment representing sediments from approximately the mid 1980s (4-6 cm core segment). Total PCB levels within these sediments are 490 ppb, which is the highest level of PCBs observed within the Finger Lakes. The PCB signal (see Figure 9.13) from Conesus Lake appears generally consistent with lower chlorinated Aroclors (e.g., Aroclor 1242). The total PCB

level observed is above the TEL and PEL. *Inorganic* chemical findings for Conesus Lake indicate fairly high arsenic concentrations within benthic sediments. However, in contrast to some of the other Finger Lakes, there was not a marked increase in arsenic levels within surficial sediment layers. Arsenic levels range from 11.0-20.2 ppm, and the arsenic levels observed are above the TEL and close to or above the PEL for arsenic. The cause(s) of the arsenic enrichment within benthic sediments is not certain – see discussion in Chapter 9. Subsequent water column monitoring conducted during 1999, albeit limited, did not detect arsenic (at > 10 ppb) within the water column of Conesus Lake – see further discussion above. Additional inorganic chemical findings for Conesus Lake are as follows: (a) Cadmium was detected in a single sediment segment (~ 1990), which is above the TEL and slightly below the PEL. However, the cadmium level within all other core segments was below detection; (b) Chromium levels range from 20.0-29.3 ppm, and show a moderate decline over time. These levels are below the TEL and PEL for chromium; (c) Copper levels range from 27.1-44.0 ppm and are fairly stable throughout the core. The copper levels observed are generally below the TEL and PEL; (d) Lead levels range from 49.1-108 ppm. Lead levels reach a maximum in the mid-1960s to early-1970s, and exhibit a marked decline thereafter. However, lead levels within surficial sediments remain above the TEL, but below the PEL; (e) Nickel levels range from 33.3-49.2 ppm and are generally stable throughout the core, with perhaps a slight decline in the upper sediments. Nickel levels are above the TEL and near or above the PEL for nickel; and (f) Zinc levels range from 140-195 ppm. Zinc levels reach a maximum in the late-1960s, and exhibit a moderate decline thereafter. Zinc levels are above the TEL but below the PEL.

Recommendations for Conesus Lake are as follows. *First*, total phosphorus levels observed within Conesus Lake are above the current New York State guidance value for total phosphorus (20 ug/l). Furthermore, anoxic conditions occur within the hypolimnion of the lake for sustained periods during the growing season. Thus, it is important that nutrient control measures within the watershed be enhanced. A nutrient loading study is also recommended for the watershed. Furthermore, as with several of the smaller Finger Lakes, nutrient dynamics within Conesus Lake are not fully understood. Therefore, it is suggested that additional study of nutrient dynamics within Conesus Lake be conducted. The focus of such a study should be to more fully define both external and internal inputs of nutrients to the lake, and to assess the ecological consequences of dissolved oxygen depletion within the hypolimnion. *Second*, the presence of Zebra mussels has been documented within Conesus Lake. Zebra mussels are believed to be having significant ecological effects on several of the Finger Lakes. Thus, a Zebra mussel monitoring program is recommended for Conesus Lake. *Third*, as with many of the Finger Lakes, chloride and sodium levels have increased over the past several decades. Thus, efforts to control the use and storage of salt within the watershed should be encouraged. *Fourth*, total PCB levels within Conesus Lake are above sediment quality guidance values. Therefore, it is recommended that fish tissue analyses be conducted in Conesus Lake. *Fifth*, as with several of the Finger Lakes, arsenic levels within the sediments of Conesus Lake are above certain sediment quality guidance values. Thus, efforts to understand the cause(s) and possible environmental consequences of the observed elevations in arsenic levels are recommended. *Sixth,* as with many of the Finger Lakes, nickel levels are elevated in the sediments of Conesus Lake. Investigation of the cause(s) and possible environmental consequences of these nickel levels is recommended.

Glossary

Aerobic: in the presence of oxygen.

Allochthonous: originating or growing away from the place of origin; not native.

Anaerobic: absence of oxygen.

Anion: a negatively charged ion.

Anoxia: the absence of oxygen – operationally defined as dissolved oxygen levels below 1 mg/l.

Autochthonous: originating or produced within a given habitat or system; native.

Bioaccumulation: the tendency for certain chemicals to increase in concentration in living organisms.

Biomagnification: the process in which certain chemical compounds (e.g., PCBs, DDT, mercury, etc.) move up the food chain, and increase in concentration within organisms at higher trophic levels.

Cations: a positively charged ion.

Clinograde: dissolved oxygen concentrations decreasing with depth – characteristic of eutrophic lakes.

Congener: a chemical substance that is related to other chemical substances in some manner.

Epilimnion: the upper waters of a thermally stratified lake.

Eutrophic: a lake or other body of water, containing an abundant supply of plant nutrients and characterized by high levels of primary productivity.

Hydrophobic: having a strong aversion for water.

Hypolimnion: bottom waters of a thermally stratified lake.

Hypoxia: waters with dissolved oxygen concentrations of less than 2 ppm, the level generally accepted as the minimum required for most marine life to survive and reproduce.

Limnology: the study of the physical, chemical, biological, and hydrological aspects of fresh water.

Lipophilic: having a strong affinity for lipid (fat) and organic material.

Lithosphere: uppermost shell of the earth, broken into a number of tectonic plates.

Maximum Contaminant Level (MCL): the MCL is the amount of a chemical substance which must be reported to state authorities if discovered by a local water treatment plant.

Macrophyte: a large plant.

Mesotrophic: a lake or other water body having intermediate amounts of plant nutrients and levels of primary productivity.

Metalimnion: the water column layer of a thermally stratified water body characterized by a rapid change in temperature – also see thermocline.

Oligotrophic: a lake or other water body having low amounts of plant nutrients and levels of primary productivity.

Organochlorine: a class of manmade chemicals composed of carbon and chlorine.

Orthograde: dissolved oxygen concentrations increasing with depth – characteristic of oligotrophic lakes.

Paleolimnology: the study of the conditions and processes of lakes in the geologic past.

pH: a symbol representing the logarithm of the reciprocal of the hydrogen-ion concentration of an aqueous solution - used to express the relative acidity or alkalinity of an aqueous solution.

Phytoplankton: a type of free floating plant plankton, such as algae, that is the basic food source in many aquatic and marine ecosystems.

Probable Effect Level (PEL): The concentration level of a particular chemical, above which, it is believed to be frequently associated with adverse biological effects on resident biota.

Radiometric Dating: a method of determining the approximate age of certain objects based upon the ratio of a radioisotope concentration to that of a stable isotope.

Secchi Disk: a black and white disk used to measure water clarity.

Seiche: the pendulum-like movement of a body of water that continues after cessation of the originating force - usually wind but may be other atmospheric phenomena or seismic disturbances; a tide is a special case of a seiche.

Stoichiometric: the branch of chemistry that applies the laws of definite proportions and conservation of matter and energy to chemical processes.

Synoptic: obtained simultaneously over a wide area in order to afford a simultaneous overall view.

Thermal Stratification: The formation of distinct layers of different temperatures in a lake or reservoir.

Thermocline: The depth at which there is a rapid decrease in temperature in a thermally stratified lake or reservoir - usually defined as >= 1°C per meter.

Threshold Effect Level (TEL): The concentration level of a particular chemical, above which, it is believed to be occasionally associated with adverse biological effects on resident biota.

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Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 13, 2021 9:11:55 PM

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 13, 2021 8:18:40 PM

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 13, 2021 2:42:23 PM

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 13, 2021 4:58:26 AM

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 12, 2021 4:47:44 PM

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 12, 2021 8:08:34 AM

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Wednesday, August 11, 2021 8:30:28 PM

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Tuesday, August 10, 2021 9:53:26 PM

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Tuesday, August 10, 2021 6:30:35 PM

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Monday, August 09, 2021 5:26:57 PM

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 09, 2021 12:38:22 PM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

Additional comments
There are so many questions to consider before taking this action. Please allow that process to unfold. Thanks, Gretchen

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 09, 2021 10:29:20 AM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 09, 2021 7:24:02 AM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Monday, August 09, 2021 7:15:41 AM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
Skaneateles Lake is one of the most vital natural resource assets we have in New York State! Please move forward prudently!

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Monday, August 09, 2021 7:00:59 AM

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To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Monday, August 09, 2021 5:52:21 AM

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Map It <https://protect2.fireeye.com/v1/url?k=193ae3bd-46a1daa6-19381a88-0cc47a6d17e0-669f1f39101026c8&q=1&e=dc0c3f75-b2a0-4d01-9b14-8c277395f5b7&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D2432%2Bwave%2Bway%252C%2BNew%2Byork%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Monday, August 09, 2021 5:42:28 AM

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JC Palermo
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Map It <https://protect2.fireeye.com/v1/url?k=5b18e0f5-0483d832-5b1a19c0-000babd9f75c-841d98d348cffc29&q=1&e=50f78042-a302-4bb0-b3a7-81fe39a36acf&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D1264%2BGreenfield%2BLane%252C%2BSkaneateles%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
More stringent controls should be implemented regarding use of fertilizers on lakeshore residential properties

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Sunday, August 08, 2021 8:24:39 PM

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Map It <https://protect2.fireeye.com/v1/url?k=a1e333eb-fe780b36-a1e1cade-0cc47aa8c6e0-eface9d2fc19c11b&q=1&e=b03fb02f-8047-4912-9bf3-2967cc55e6d4&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D20%2BEast%2BElizabeth%2BStreet%252C%2BNY%2B13152>

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Sunday, August 08, 2021 4:26:56 PM

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Maryann Cawley
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1264 Greenfield Lane, Skaneateles NY. 13152
Map It <https://protect2.fireeye.com/v1/url?k=0ac892aa-5553abeb-0aca6b9f-000babda0106-73ef99f7a0a204de&q=1&e=0c332c3d-7ef2-4ce6-bde2-c3aa25217d9c&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D1264%2BGreenfield%2BLane%252C%2BSkaneateles%2BNY.%2B13152>

Additional comments
Rather than add something to the lake that may harm our ecosystem, DEC and the State legislature should do more to prevent the use of fertilizers for residential and recreational use. We have many, many pristine green lawns in this watershed as well as a beautifully green golf course. And any laws regulating chemical landscaping should be ENFORCED with heavy fines and reports in the media. With the increase of global warming this problem will only get worse.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Sunday, August 08, 2021 3:46:00 PM

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Map It <https://protect2.fireeye.com/v1/url?k=19e7a350-467c9a4b-19e55a65-0cc47a6d17e0-3e1bc47ace2fe970&q=1&e=d99b87a0-d2a9-4c54-8df4-3734d1565e0d&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13215>

Additional comments

We live on the shore of Skaneateles Lake. We have no well, thus we have no choice but to pull all our water, including our drinking water, from the lake. Therefore, without definitive, unbiased assurances that the use of EarthTec will not affect our health, we are very concerned about the use of these chemicals. Assurances made by the company that produces EarthTec simply cannot be considered unbiased. We have dealt with the inability to use lake water before because of HAB blooms, but those inconveniences, however unpleasant, were at least time limited. Furthermore, for the same reasons, we are just as considered about the effects of introduced chemicals on the natural fauna and flora of the lake. Please proceed in accordance with the recommendations of the SLA.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Sunday, August 08, 2021 3:23:12 PM

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Joseph Reagan
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jor56@aol.com <mailto:jor56@aol.com>
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Map It <https://protect2.fireeye.com/v1/url?k=fa0cc6e1-a597ffa6-fa0e3fd4-000babd9fa3f-b1df4f9faaf3a691&q=1&e=a0622bb7-0bc0-4b3c-9fa9-838a8f15213b&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkan%252C%2BOnondaga%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments

This is being done too quickly. There should be a better assessment by the scientific community about long term effects of EarthTec. I understand fully it has been used before in this lake and others ,but I am not convinced it is the solution to our problem and that it may contribute to the creation of other complications secondary to this

application.
I would ask for more time for extensive dialogue with scientists from both sides of the issue and then a public forum to present those findings.
Thank you Respectfully Joseph O. Reagan M.D.

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Monday, July 26, 2021 11:22 AM
To: Hanson, Karyn D (DEC)
Subject: FW: Water Quality for residents around the lake

FYI

-----Original Message-----
From: Barbara Benedict <barb.benedict@gmail.com>
Sent: Saturday, July 24, 2021 9:27 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: Water Quality for residents around the lake

What system is needed in order to not have containment's from potential exposure to this chemical being administered twice a year. We get our water from the lake. I don't want to drink chemicals.

We know winds carry things all over the lake.

Barb Benedict

Sent from my iPhone

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Sunday, August 08, 2021 1:02:10 PM

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Barbara Benedict
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Address
1840 Tamarack Trail, Skaneateles 13152
Map It <https://protect2.fireeye.com/v1/url?k=89edf894-d676c1ab-89ef01a1-000babda0031-4d80b30f96500aac&q=1&e=28c6fddb-89d6-4dd1-aa7d-786afb165334&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D1840%2BTamarack%2BTrail%252C%2BSkaneateles%2B13152>

From:	Barbara Benedict
To:	dec.sm.Comment.Skaneateles2021
Subject:	EarthTec Application Permit for spreading copper sulfate on Skaneateles Lake
Date:	Tuesday, March 1, 2022 7:09:05 PM

ATTN: Kary Hanson:

I listened to the presentation by Earth Tec in 2021. At the time the representative from Earth Tec compared Skaneateles Lake to another body of water that I did not think was a good comparison. I also was not impressed with the information from Earth Tec.

In addition I support the concerns voiced by the Skaneateles Lake Association.

We get our water from the lake. We do not want to use the water after the treatment. I assume that may be as long a 14 days. We know on a windy day, we get lots of stuff on our shores. We face North.

I am against the spreading of copper sulfate until the lake association feels comfortable having the application on the lake.

Barb Benedict
1840 Tamarack Trail

Barbara Benedict

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Sunday, August 08, 2021 8:18:25 AM

Name
Paul Torrisi
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Map It <https://protect2.fireeye.com/v1/url?k=0e99594e-5102607c-0e9ba07b-000babd905ee-80bc366b5cd0ba74&q=1&e=5789044b-8df0-4e7a-85ac-77eef35e4c23&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments

1)Too many uncertainties about EarthTec's efficacy when administered in a large recreational lake(reservoir) with a water volume over 400 billion gallons-after discussing at length with a scientific consultant from the EarthTec company(Kirk Langston from ATS in Utah) no comparable previously treated waterbodies identified-

experimental use in Skaneateles Lake?
2)When discussing at length with City of Syracuse water dept., the stated use of this copper sulfate product, EarthTec, is stated to be for "last ditch emergency use only" but this is not stated in the SPDES Permit as such- no specific guidelines for triggering action mentioned and no mention of using the company "Solitude Lake Management from Oneonta,NY, to administer when City officials request-this mechanism of both the methodology of calling an outside company within a restricted timeline in the middle of "HAB season" to administer the correct dose (potentially toxic to humans and the lake ecosystem) needs to be carefully stated in the SPDES Permit.
3) Too many "loose ends and uncertainties" as current SPDES Permit is written: for example on page 3 under "Facility Information", no mention of the first line of chlorination at the two in-lake City intakes, recently upgraded. Also, on the map, Fig.2, the "Skaneateles pier" is incorrectly labeled at the DEC Boat Launch site, about two miles away from its actual location adjacent to the Village of Skaneateles bathing area.
4) The outline of the 560 acre location in north basin of the lake on map, Fig.1, seems arbitrarily selected due to its relative location surrounding the City's intakes, based on the condition that microcystin's half-life is only a couple of days, according to City officials.
However, when the most recent lake wide HAB occurred in 2017, the situation most agree would trigger "emergency use" of such an algicide as EarthTec, the microcystins produced from all over the lake persisted and circulated for weeks/months, even after visible blooms had dissipated. Shouldn't scientific experts be consulted to better define these parameters prior to approving such arbitrary use of such a potentially toxic algicide ?
5) Wholeheartedly agree with SLA's well thought out and scientific comments recommending postponing EarthTec's approval at this time, until all the unknowns and uncertainties are meticulously addressed.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Sunday, August 08, 2021 6:28:23 AM

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Map It <https://protect2.fireeye.com/v1/url?k=41960ddf-1e0d34bd-4194f4ea-000babd9069e-f8a82234c168372a&q=1&e=6a73aac6-4dc6-4f4e-b6fb-68a36c59a58c&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D38%2BAcademy%2BSt%252C%2BSkaneateles%2BNy%2B13152>

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Additional comments
I agree more research is needed - we can't go back so let's do this right.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Saturday, August 07, 2021 11:53:29 PM

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To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Saturday, August 07, 2021 2:12:57 PM

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Address
3069 E Lake Rd, Skaneateles NY 13152
Map It <https://protect2.fireeye.com/v1/url?k=a1f7b251-fe6c8b16-a1f54b64-000babd9fa3f-937713bf8b965bf8&q=1&e=6e40d2cc-f820-4e25-ae1b-a2acab31ee23&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D3069%2BE%2BLake%2BRd%252C%2BSkaneateles%2B%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

Additional comments
Support !

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Saturday, August 07, 2021 12:06:25 PM

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Additional comments

We reside most of the year on the east side of Skaneateles Lake. Our address is 1701 Borodino Bluffs. We are strongly opposed to the use of Copper Sulfate or any other algicide in our Lake. As we understand the proposed permit, the intent is to introduce this compound in solution into the northern end of the lake only in times of severe cyanobacteria outbreaks. A poison that kills algae (plants) may also be an effective killer of bacteria. Our research of the literature available indicates this may be true. Why this mass genocide hammer approach is necessary to reduce one type of bluish-green bacteria is very unclear to us. If the City needs such an emergency agent, please use it in the Woodland Reservoir. It is not permissible in Skaneateles Lake.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Saturday, August 07, 2021 11:26:35 AM

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Map It <https://protect2.fireeye.com/v1/url?k=89982044-d603195f-899ad971-0cc47a6d17e0-427bf06de93a68a0&q=1&e=993fb89f-2dc3-445c-9858-9a0004a7a4ed&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

Additional comments
Please, no chemicals in Skaneateles Lake. Not only is it pristine, but drinking water for Syracuse. To have survived this long is a miracle.

There are more enlightened methods of treatment.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Saturday, August 07, 2021 11:15:30 AM

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Additional comments
Let's not take chances. We are so fortunate to have such a beautiful lake. More research needed!

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Saturday, August 07, 2021 10:37:57 AM

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Map It <https://protect2.fireeye.com/v1/url?k=b59f66b9-ea045f86-b59d9f8c-000babda0031-003cf2cc05de5d06&q=1&e=f55de5d8-3ec1-45ee-b367-cd6d7cc5a877&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNew%2BYork%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Saturday, August 07, 2021 9:52:53 AM

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Saturday, August 07, 2021 9:16:24 AM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Saturday, August 07, 2021 9:09:53 AM

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Map It <https://protect2.fireeye.com/v1/url?k=d8790f18-87e2362a-d87bf62d-000babd905ee-f679a364c7e1f5a1&q=1&e=53fec95c-54e1-4306-9422-a949db238a86&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Saturday, August 07, 2021 7:36:01 AM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments

Please schedule an informational public meeting to discuss this before any action is taken. Thank you.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 11:43:09 PM

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Additional comments
This is the dumbest idea ever, and it's disgusting to even suggest doing this. Before one even thinks of adding copper sulfate to the water, there needs to be a moratorium on glyphosate and chemlawn products in the watershed, a moratorium on concentrated feed lot animal waste within the watershed, and an inspection of all septic tanks along the lake. Fix the source of the problem or it will continue to appear. This is a man made problem. The health of the lake is directly proportional to the expansion of human activity around it.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 10:59:23 PM

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Additional comments
We have a family camp in the lake. Before dumping chemicals in the lake, you need to hold a meeting to explain the process and present the environmental impact review that presumably you have done. I would like to know what plans you have to PREVENT the growth of algae. Who was involved in the decision making?

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 10:18:27 PM

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 9:07:55 PM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From: Mike Yates
To: dec.sm.Comment.Skaneateles2021
Cc: frank.moses.sla@gmail.com
Subject: FW: City of Syracuse Article 17 Titles 7 & 8 Industrial SPDES-Surface Discharge- (7-3150-00112/0004)
Date: Monday, February 28, 2022 7:40:34 PM

Sent from Mail for Windows

From: Mike Yates
Sent: Monday, February 28, 2022 6:25 PM
To: deppermitting@dec.ny.gov
Cc: frank.moses.sla@gmail.com
Subject: City of Syracuse Article 17 Titles 7 & 8 Industrial SPDES-Surface Discharge- (7-3150-00112/0004)

I am writing to provide comment regarding the above referenced SPDES by the City of Syracuse to use the algicide Earth Tec in Skaneateles Lake, allegedly to control micosystin-producing cyanobacteria.

I am against the DEC approval of this application.

While recent cyanobacteria blooms are unacceptable, adding more chemicals to the lake is not the solution. The real solution is the minimization of the chemicals entering the lake causing the blooms. The City of Syracuse, the NYS DEC, and the surrounding counties, villages and towns have not done the hard work to minimize these chemicals. The use of an algicide is a cop out.

Specific actions that these governmental bodies should take include: A) the inspection all septic systems in the water shed and the requirement to replace/repair those that are non-conforming; and B) the prohibition of the commercial application of lawn fertilizers containing cyanobacteria boosting chemicals within the watershed.

I understand that Onondaga, Cayuga, and Cortland counties all have programs in place to help homeowners repair/replace faulty septic systems in the watershed. However, no homeowner I have talked to on the lake is aware of these programs. What specific action has been taken to promote this program? More importantly, these counties heath departments need to inspect all septic systems in the water shed and force compliance.

Elimination of commercial fertilizer applications will have an immediate positive impact and should be implemented before the spring fertilizing season.

Mike Yates
42 Hannum St.
Skaneateles, NY

Sent from Mail for Windows

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 9:07:19 PM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 9:05:08 PM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 9:02:17 PM

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To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 7:18:26 PM

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 6:38:42 PM

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Additional comments
Do not use EarthTec in Skaneateles Lake or any of the Fingerlakes!

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 6:36:59 PM

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Additional comments
Please do not use EarthTec Skaneateles Lake!

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To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 5:32:41 PM

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To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 4:59:59 PM

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To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 4:49:55 PM

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Melissa Pavlus
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Map It <https://protect2.fireeye.com/v1/url?k=8d0e1cb8-d295247f-8d0ce58d-000babd9f75c-74259ab035f5a86c&q=1&e=d970a5c8-6208-4868-a1fa-6c10ff41b46d&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D3325%2BKane%2BAve%252C%2BSkaneateles%252C%2BNY%2B13152>
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Additional comments
Before making any chemical additions to our lake, I believe we should investigate the environmental and health implications as thoroughly as possible. Additionally, I believe more should be done to regulate and prohibit pesticide/chemical use on waterfront properties as well as those in the watershed.

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To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 4:47:02 PM

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To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 4:27:50 PM

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Name
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Address
Skaneateles, NY 13152
Map It <https://protect2.fireeye.com/v1/url?k=f9f9b1a0-a66288e7-f9fb4895-000babd9fa3f-ddd21f0c5d59ac63&q=1&e=a52c52d9-5364-44be-bc42-681f6afcef38&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 3:47:04 PM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
As noted above, I support the Skaneateles Lake Association's position.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 2:21:23 PM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 1:40:52 PM

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Map It <https://protect2.fireeye.com/v1/url?k=a40020e2-fb9b19f3-a402d9d7-000babd9fe9f-5f80cec18795b0c8&q=1&e=d13f0f0f-d208-4ba7-83f8-196b815d9d62&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D2332%2Bwest%2Blake%252C%2BSkaneateles%2BNy%2B13152>

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 1:39:53 PM

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Map It <https://protect2.fireeye.com/v1/url?k=00249610-5fbfaecd-00266f25-0cc47aa8c6e0-a76c4407541bea01&q=1&e=a50f43a1-5dbc-439d-a580-b3fd176ab53f&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 1:12:42 PM

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Additional comments
have spent summers on the lake since 1939 - realize problems exist in the water quality but feel more study needs to be done before jumping in with this product..

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 12:51:24 PM

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From: Cindy Bright
To: dec.sm.Comment.Skaneateles2021
Subject: EarthTec in Skaneateles lake
Date: Wednesday, March 2, 2022 5:05:06 PM

To Whom It May Concern:

Though I did not speak at the meeting last night about using EarthTec in Skaneateles lake, I wanted to echo my support for the many speakers who so elegantly detailed why we should not proceed with this course until further study has been done and all of the affected lakefront homeowners have been notified and allowed to weigh in. I was shocked that the DEC has not included prior notification to the affected homeowners in their plan.

Cindy Bright
12 Lakeview Circle
Skaneateles, NY 13152
(315)416-4041

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 12:49:32 PM

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Map It <https://protect2.fireeye.com/v1/url?k=5535ed29-0aaed44b-5537141c-000babd9069e-508c29bae5d04d5b&q=1&e=3c247639-591e-4a1b-98a8-28db7d51e7b8&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSyracuse%252C%2BNY%2B13219>

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To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 12:18:49 PM

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Map It <https://protect2.fireeye.com/v1/url?k=a9fb0321-f6603a1b-a9f9fa14-ac1f6b44fec6-d5326c5fc1760163&q=1&e=c52179ca-7662-48a7-9944-445a65152e29&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

dec.sm.Comment.Skaneateles2021

From: Jason Persse <jasonpersse@gmail.com>
Sent: Tuesday, March 1, 2022 3:03 PM
To: dec.sm.Comment.Skaneateles2021
Subject: SPDES Permit Application for Skaneateles Lake

To whom it may concern,

As residents of the town of Skaneateles, we strongly urge the New York State Department of Environmental Conservation to deny or indefinitely postpone consideration of the City of Syracuse's permit application for use of the algicide EarthTec in Skaneateles Lake.

Among the many compelling reasons for denial of this application (including insufficient data on immediate aquatic-life impact, indeterminate preexisting levels of elemental copper in Skaneateles Lake sediment, and the lack of a post-application monitoring plan), we are most concerned about the startling lack of literature or case studies demonstrating the overall efficacy and—more importantly—long-term environmental impacts of copper sulfate pentahydrate and metallic copper treatment on similar lake ecosystems.

Given that no satisfactory data or case studies have been provided covering a) the long-term effects on humans or pets exposed through ingestion of lake water, swimming and recreational activities, etc.; b) long-term effects on aquatic life, lake oxygen levels, etc.; or c) the potential need for reapplication, etc. in the face of rising average temperatures and increased agricultural/residential nutrient runoff, the approval of this application would be, at best, irresponsible. Given the potentially massive adverse impact to the ecological and financial well being of the community and the region as a whole, we ask again that you deny the application at this time.

Thank you for your time and consideration.

Jason and Kim Persse
Skaneateles, New York

--
Jason Persse
jasonpersse@gmail.com
Pronouns: he/him

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Tuesday, August 10, 2021 2:29 PM
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application # 7-3150-00112/00004

Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 06, 2021 9:08 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Kim Persse

Email

kimpersse@gmail.com

Address

2705 East Lake Road, Skaneateles NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. •

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 12:17:58 PM

Name

Theresa Potenza

Email

tpotenza6@gmail.com <mailto:tpotenza6@gmail.com>

Address

Skaneateles, NY 13152

Map It <https://protect2.fireeye.com/v1/url?k=576b7ef7-08f047b6-576987c2-000babda0106-dcd4e755ad4d7467&q=1&e=439f9338-43fb-4445-b31a-deb9df111700&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

Additional comments

How does this impact those of us that draw our drinking water directly from the lake?

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 11:50:01 AM

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Name
Scott Mcclurg
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4435 Kasson Rd, NY Syracuse 13215
Map It <https://protect2.fireeye.com/v1/url?k=2fc1d75d-705aee46-2fc32e68-0cc47a6d17e0-d259a911aea52201&q=1&e=2634d7aa-b808-40f4-88cc-4d9d22a725d6&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D4435%2BKasson%2BRd%252C%2BNY%2BSyracuse%2B13215>

Additional comments
I oppose the use of the Copper Sulfate chemical . I have talked extensively to Dr Neil Murphy the former President of ESF .He is probably one of the most knowledgable individual regard water . He is opposed and after conversation with him I am opposed .
Respectfully
Scott F. McClurg

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 10:55:28 AM

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Peter Isler
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1995 Woodland Lane, NY 13152
Map It <https://protect2.fireeye.com/v1/url?k=b7ee0d2f-e87535f2-b7ecf41a-0cc47aa8c6e0-7e9d9b18aca1c3ee&q=1&e=5c8eda18-e878-40a2-bd5c-a3d4a83cf74a&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D1995%2BWoodland%2BLane%252C%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
Please keep our lake pure, the water temp is colder this year... no algae

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 10:53:20 AM

Name
Lindsay Kowalski
Email
lindsaywkowalski@gmail.com <mailto:lindsaywkowalski@gmail.com>
Address
54 w lake st, Skaneateles 13152
Map It <https://protect2.fireeye.com/v1/url?k=0b4bd9ce-54d0e0d5-0b4920fb-0cc47a6d17e0-708911563755485f&q=1&e=9266698b-7968-4c51-a9fd-5917aa19f459&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D54%2Bw%2Blake%2Bst%252C%2BSkaneateles%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 10:33:33 AM

Name
Meg Steele Wingerath
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wingerath4@aol.com <mailto:wingerath4@aol.com>
Address
Skaneateles, New York 13152
Map It <https://protect2.fireeye.com/v1/url?k=c05d77d8-9fc64f05-c05f8eed-0cc47aa8c6e0-ab5a6b0ae962aa2a&q=1&e=bfc9500a-9324-4db7-a408-3adeb78f9299&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNew%2BYork%2B13152>

Additional comments
My family and I support any actions that maintain the pristine Skaneateles Lake.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 10:12:05 AM

Name
Robert Bellinger
Email
robbellinger1@verizon.net <mailto:robbellinger1@verizon.net>
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Skaneateles, New York 13152
Map It <https://protect2.fireeye.com/v1/url?k=b4683bed-ebf302ac-b46ac2d8-000babda0106-67bd29f09cc0ec32&q=1&e=9e65e316-e562-494d-9862-ba38794dd8ae&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNew%2BYork%2B13152>

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 9:32:40 AM

Name
Chelsea Leveille
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3066 East Lake Road, Skaneateles 13152
Map It <https://protect2.fireeye.com/v1/url?k=82ad301b-dd360915-82afc92e-0cc47aa88e08-c1e49af1280c4485&q=1&e=e14b3394-40a5-4452-93cd-cb44d5d2fa63&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D3066%2BEast%2BLake%2BRoad%252C%2BSkaneateles%2B13152>

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Additional comments
I oppose the introduction of algicide EarthTee in Skaneateles Lake.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 9:26:40 AM

Name
Meryl Eriksen
Email
meryl.eriksen@gmail.com <mailto:meryl.eriksen@gmail.com>
Address
11 West Elizabeth Street, Skaneateles NY
Map It <https://protect2.fireeye.com/v1/url?k=20cc79e5-7f5740d7-20ce80d0-000babd905ee-21001464a8380b88&q=1&e=ad735a86-fa81-4817-b8bc-58341bc590ad&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D11%2BWest%2BElizabeth%2BStreet%252C%2BSkaneateles%2BNY>
Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From: Meryl Eriksen
To: dec.sm.Comment.Skaneateles2021
Subject: Fwd: Opposition to Earthtec
Date: Wednesday, March 2, 2022 1:23:36 PM

Hello Karyn Hanson,

I am a resident of the village of Skaneateles and oppose the use of Earthtec in Skaneateles Lake to combat harmful algae blooms.

Please add my note to the record.

Meryl Eriksen

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 9:23:50 AM

Name
Jill Girzadas
Email
jillyp@yahoo.com <mailto:jillyp@yahoo.com>
Address
Skaneateles, NY 13152
Map It <https://protect2.fireeye.com/v1/url?k=89ffec04-d664d53e-89fd1531-ac1f6b44fec6-da5d428123bdb32d&q=1&e=5bbb0837-2235-443e-959d-3e82c0153608&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 9:18:59 AM

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Map It <https://protect2.fireeye.com/v1/url?k=eaa6ade8-b53d94da-eaa454dd-000babd905ee-074e42191aee9fa0&q=1&e=f6856680-33dc-48e5-8860-a6d2bb567265&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D38%2BThe%2BOrchard%252C%2BNY%2BFayetteville%2B13066>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
Our grandchildren are fifth generation summer residents on both sides of our family. We cherish what has always been the beauty and purity of the lake waters; however, we are extremely concerned and disturbed by the changes that have been happening over the last few years. While we agree that something needs to be done to prevent further damage and mitigate the HAB issue, the use of chemical agents without further research seems to be like jumping from the frying pan into the fire.

Please defer making a decision of this importance without thoroughly studying all of the issues outlined by the Skaneateles Lake Association. Thank you. Ed and Pam Ryan

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 8:43:50 AM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 8:42:35 AM

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 8:38:29 AM

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Map It <https://protect2.fireeye.com/v1/url?k=31b5607a-6e2e58bd-31b7994f-000babd9f75c-96efce23a501631d&q=1&e=4e03607b-7c87-4712-858d-22dc3fa9a048&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D794%2BBooth%2BRoad%252C%2BNY%2B13152>

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Additional comments

Too many unknowns with this chemical - it's also listed as killing weeds like invasive milfoil as well as zebra mussels. What impact will the die off of these species in addition to the HAB release of toxins have on the ecosystem short and long term? What is the protocol for shoreline residents if/when this chemical is applied? No recreational use of water? No drawing water directly from the lake? There has been no communication to shoreline residents about impacts!

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 8:38:04 AM

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To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 8:35:55 AM

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 8:32:02 AM

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Map It <https://protect2.fireeye.com/v1/url?k=e9193c88-b6820593-e91bc5bd-0cc47a6d17e0-ee4a4dd07c1e63f6&q=1&e=26e38a4d-7c5c-47c0-b970-cb17239c3643&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D4304%2BAbbey%2BRd.%252C%2BNY%2B13215>

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Additional comments

Please do not allow use of EarthTec at this time.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 8:27:04 AM

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Additional comments
I agree with the Skaneateles Lake Association comments.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 8:26:54 AM

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Additional comments
Please do not allow Earth Tec to put into Skaneateles Lake! It's too risky at this point.

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To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 8:23:53 AM

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Map It <https://protect2.fireeye.com/v1/url?k=6bd2e11d-3449d9da-6bd01828-000babd9f75c-6ac3c4bfc3dc03b8&q=1&e=6713ea2e-4852-499b-864c-6d6281b92578&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3Dskaneateles%252C%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 8:06:09 AM

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James Tifft
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2759. Hardscrabble, NY. Skaneateles. 13152
Map It <https://protect2.fireeye.com/v1/url?k=7884ff40-271fc67f-78860675-000babda0031-fe49d1570ef81a23&q=1&e=3568f7d9-c0a4-49fa-a100-3265b2c1e1f2&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D2759.%2BHardscrabble%252C%2BNY.%2BSkaneateles.%2B13152>

From: James Tifft
To: dec.sm.Comment.Skaneateles2021
Subject: Copper sulfate treatment
Date: Wednesday, March 2, 2022 11:19:18 AM

I am opposed to the use of copper sulfate for treatment of algal blooms in Skaneateles Lake. It will release toxins(which may not have been released) and impact the ecosystem of the lake with permanent copper in the sediment(another toxin).

Jim Tifft. MD. FACP

Sent from my iPhone

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 8:05:15 AM

Name
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Map It <https://protect2.fireeye.com/v1/url?k=a69a235e-f9011a19-a698da6b-000babd9fa3f-06232932f01b6e36&q=1&e=153c77e6-7bda-4a23-b27f-a7f37d3b5e95&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D2985%2BBenson%2BRoad%252C%2BSkaneateles%2BNew%2BYork>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 7:58:27 AM

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Map It <https://protect2.fireeye.com/v1/url?k=1c69759d-43f24c8c-1c6b8ca8-000babd9fe9f-c038082ce12736de&q=1&e=47213ac5-3b28-4aad-8934-8e47e0fec004&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 7:56:51 AM

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Map It <https://protect2.fireeye.com/v1/url?k=dba8cb41-8433f25a-dbaa3274-0cc47a6d17e0-9852c6cb88df948d&q=1&e=b118383a-c8fe-4094-95f4-42aeb376ec63&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

Additional comments
no chemicals in our lake!

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 7:55:15 AM

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Map It <https://protect2.fireeye.com/v1/url?k=ca540133-95cf3872-ca56f806-000babda0106-ee3469283d8aa473&q=1&e=2ba5da41-dff7-4926-a5fe-cdf168da90b9&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D2874%2BWest%2BLake%2BRoad%252C%2BNY%2B13152>

Additional comments
I do not want the Earth tec product put into Skaneateles Lake without checking other resources that could be investigated first. I feel that more research should be done on the Earth tec product and other ways to get rid of algae blooms.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 7:41:12 AM

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Map It <https://protect2.fireeye.com/v1/url?k=eedc08e3-b1473024-eedef1d6-000babd9f75c-99490d1f88c45c20&q=1&e=090a4aba-c037-45fc-9185-89f05e6314e5&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNew%2BYork%2B13152>

Additional comments
No Earth Tec.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 7:38:34 AM

Name
John MacAllister
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2 Prentiss Dr, NY skaneateles, 13152
Map It <https://protect2.fireeye.com/v1/url?k=faf83668-a5630f57-fafacf5d-000babda0031-5e18f48c75855f57&q=1&e=23c11af1-5522-4b32-97b7-920612115ad5&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D2%2BPrentiss%2BDr%252C%2BNY%2Bskaneateles%252C%2B13152>
Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
Chlorine addition has been sufficient during the worst bloom periods. i.e. September, 2017

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 7:36:00 AM

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Paul Leone
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Map It <https://protect2.fireeye.com/v1/url?k=b27cba0a-ede78335-b27e433f-000babda0031-05d7d8c1fb66e40e&q=1&e=46335297-d174-4b92-b2e9-8744acbb49ac&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 7:35:18 AM

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

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Additional comments

I strongly oppose treatment of Skaneateles Lake with the EarthTec Algicide. This is a pesticide. I am a homeowner in the proposed application zone using the lake for both recreational activities but also as a primary source of drinking water with an in home filtration system as many residents do in the application area. For these

locations city water is not available. According to factsheets posted by the National Pesticide Information Center there are both ingestion and dermal effects of Copper Sulfate and toxicity for humans and animals is a risk http://npic.orst.edu/factsheets/archive/cuso4tech.html <https://protect2.fireeye.com/v1/url?k=9595f643-ca0ecf67-95970f76-000babd9f8b3-b5f7b023ddd2bc32&q=1&e=b5411bbf-c021-45d9-8b5e-4547f0114e93&u=http%3A%2F%2Fnpic.orst.edu%2Ffactsheets%2Farchive%2Fcuso4tech.html> . Since there is a lack of clarity on how Copper Sulfate will impact the ecosystem longer term (staying in sediment etc) this is a critical concern. I support the SLA request for further evaluation but also directly oppose using pesticide in our Lake period. Any treatments should be ensured to be safe for ingestion, not only at specific levels that are monitored only at specific times but at any level.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 7:32:48 AM

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Map It <https://protect2.fireeye.com/v1/url?k=6270b98c-3deb8082-627240b9-0cc47aa88e08-8b20b959e10b7221&q=1&e=8d91300c-d852-4de7-bb8b-924915cafe46&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D55%2BE%2BLake%2BSt%252C%2BSkaneateles%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
I feel This will damage our drinking water as well as our beautiful lake! This lake has been a god send to millions and to go and put a chemical into it is one of the craziest ideas I ha e heard of! There are other ways of treating and or combatting this problem!

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 7:32:37 AM

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Kathleen ODonnell
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Map It <https://protect2.fireeye.com/v1/url?k=340fc77c-6b94fe6d-340d3e49-000babd9fe9f-5fc6ac32040611e9&q=1&e=351a60f6-4240-48ef-88b0-f38bf974bd62&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DHomer%252C%2BNY%2B13077>

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 7:25:01 AM

Name
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Map It <https://protect2.fireeye.com/v1/url?k=99ee5701-c6756e3b-99ecae34-ac1f6b44fec6-8c0bcc2e2b825834&q=1&e=cbded0b8-c502-4c99-8635-8c71635127a9&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B1315>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From: Sharon Azzam
To: dec.sm.Comment.Skaneateles2021
Subject: Save Skaneateles Lake
Date: Wednesday, March 2, 2022 6:35:18 AM

Hello

I want to voice my concern against aligicide Earthtec and it use in Skaneateles lake. Our clean water should not be used as testing ground for a new product that scientist says could hard the aquatic life.

I also want to know why we are just hearing about this now. As a lifetime village resident and a new lake front homeowner this is my drinking water and always has been. As our environment is being threatened more and more please don't destroy our lake with this chemical.

Thank you

Sharon Azzam
315-557-6160

Sent from my iPhone

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 7:24:19 AM

Name

Patricia Weisse

Email

patty.weisse@gmail.com <mailto:patty.weisse@gmail.com>

Address

3805 Jordan Rd, Skaneateles 13152-9317

Map It <https://protect2.fireeye.com/v1/url?k=8a8282e1-d519bba0-8a807bd4-000babda0106-15b851eacf5ca41f&q=1&e=a3ba30a9-3e3c-436d-920e-f2b43c82f601&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D3805%2BJordan%2BRd%252C%2BSkaneateles%2B13152-9317>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments

Treatment is no substitute for sound stewardship practices that protect the lake. We need to put the needs of ALL the people that drink the water ahead of those wealthy, influential people that put personal gain above common need.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 7:21:24 AM

Name
Stephen Weber
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4134 Oneil Rd, NY Auburn 13021
Map It <https://protect2.fireeye.com/v1/url?k=c9b42bf8-962f1325-c9b6d2cd-0cc47aa8c6e0-7f5fbe7de7acd043&q=1&e=f91d8e22-e804-4acc-8d95-9c4073bd1c16&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D4134%2BOneil%2BRd%252C%2BNY%2BAuburn%2B13021>

Additional comments
I oppose this treatment .

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 7:19:07 AM

Name
Mark McSwain
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Map It <https://protect2.fireeye.com/v1/url?k=a27c4fda-fde7769b-a27eb6ef-000babda0106-172560c5bcd6c3c3&q=1&e=15e4f89f-23eb-4e90-b9dc-ff4a3274d1cb&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 7:13:41 AM

Name
James Sheldon
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Map It <https://protect2.fireeye.com/v1/url?k=2f9c67f9-70075ec3-2f9e9ecc-ac1f6b44fec6-423173dfe6cca9f1&q=1&e=d1a9038d-889e-4f46-a588-4fcd44ee4f34&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNew%2BYork%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
New York State the city of Syracuse and the DEC has no tested this on this body of water.
This is a huge risk with no proven results for the long term.
The blooms on the lake are minimal and short lived.
It's time for the city of Syracuse to make the needed improvements that are long overdue.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 7:01:23 AM

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Diane Emord
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Map It <https://protect2.fireeye.com/v1/url?k=4adba3b8-15409a8a-4ad95a8d-000babd905ee-b03abf2aa4f88467&q=1&e=01bf68f9-50a9-4569-913b-48ddca2471b3&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSyracuse%252C%2BNY%2B13207>

Additional comments
This is my drinking water. We need measures to prevent the formation of the algal blooms, not measures to treat them. Killing the algae does not remove the toxin.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 06, 2021 6:34:53 AM

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Map It <https://protect2.fireeye.com/v1/url?k=60c83f2e-3f53063f-60cac61b-000babd9fe9f-323037c3046485a6&q=1&e=4c3bd13e-0aa5-4f3e-8219-95a434f6662e&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DStaten%2BIsland%252C%2BNY%2B10301>

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, August 06, 2021 12:56:47 AM

Name
Michelle Mashia
Email
michelle.mashia@gmail.com <mailto:michelle.mashia@gmail.com>
Address
66 East Elizabeth street, Skaneateles NY/15132
Map It <https://protect2.fireeye.com/v1/url?k=379acd09-6801f44e-3798343c-000babd9fa3f-0b70482dc574abbf&q=1&e=4ec64588-3853-4fe5-9f68-1bf958016673&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D66%2BEast%2BElizabeth%2Bstreet%252C%2BSkaneateles%2BNY%252F15132>

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From:	Michelle Mashia
To:	dec.sm.Comment.Skaneateles2021
Subject:	Protect Skaneateles Lake from Harmful Chemicals
Date:	Wednesday, March 2, 2022 8:40:51 PM

Attention:
Karyn Hanson, NYS DEC - Division of Environmental Permits
625 Broadway, 4th Floor, Albany, NY 12233-1750

Dear Ms. Hanson,

I am a member of the Skaneateles Lake Association and have resided in Skaneateles for over 10 years. My children and I swim in the lake during the summer and do not want harmful chemicals used in Skaneateles Lake, as the NYDEC is considering.

I have been made aware of a draft SPDES permit that would authorize the City of Syracuse to treat Skaneateles Lake with the algicide, EarthTec, to decrease the density of microcystin-producing cyanobacteria that contribute to harmful algal blooms near the City of Syracuse's drinking water intakes. The use of EarthTec would occur in the northern portion of the lake.

I am firmly against the use of the chemical Earthec to be used in Skaneateles Lake for the following reasons:
1) Toxic to fish
2) Can cause irreversible eye damage
3) Use of this product may be in violation of Federal law if it causes death in endangered species or adverse modification of their habitat.

Thank you for your time and consideration,

Michelle Mashia
66 E. Elizabeth Street
Skaneateles, NY 13152

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 11:41:14 PM

Name
Michelle Ederer
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Address
121 Jordan Street, Skaneateles, NY 13152
Map It <https://protect2.fireeye.com/v1/url?k=02832e11-5d181723-0281d724-000babd905ee-8e81375505937e92&q=1&e=e22639a3-1710-4c11-9be2-6024f8437858&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D121%2BJordan%2BStreet%252C%2BSkaneateles%252C%2BNY%2B13152>

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 11:37:00 PM

Name
Catherine King
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catherinestablerking@gmail.com <mailto:catherinestablerking@gmail.com>
Address
Skaneateles, New York 13152
Map It <https://protect2.fireeye.com/v1/url?k=2a9a93ab-7501aaec-2a986a9e-000babd9fa3f-8194d82b899b4603&q=1&e=83d59949-d114-41e1-8333-c043ffb958bf&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNew%2BYork%2B13152>

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Additional comments
Rich Abbott stopped by our place after the July 12 rainfall. Our ravine had completely washed out and the protective stones on that ravine that line the approximate 100 feet that we own down to the lake. In order to protect this wonderful gem of a lake, we have spent $8000 to improve our drainage in that ravine
in a way that won't damage the lake. I would prefer that the city of syracuse spend money on preventing HABS by improving the watershed. That's what we do, and I know that would be the wish of all Skaneateles lake dwellers, tourists, the city of Syracuse, and all drinkers of the water in between Skaneateles and Syracuse

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 11:28:35 PM

Name
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Map It <https://protect2.fireeye.com/v1/url?k=e84841fa-b7d378e1-e84ab8cf-0cc47a6d17e0-d8bce1f44524a981&q=1&e=3b4865e2-d224-4697-9059-6e5a6444334d&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 11:13:16 PM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments

It would make a lot more sense to protect the lake from HABS by the City of Syracuse, the towns in the Watershed of Skaneateles Lake, the village of Skaneateles, the State Transportation Department, the DEC. Soil and Water Conseration and the OGS doing a better job of following their documented codes and even making them

more stringent to protect the lake from erosion and nutrient feeding of the lake than to be planning for an intervention to deal with a problem (HABs) that is caused by the lack of all of these agencies not doing their jobs It is sickening to go around this lake and see what all of these agencies and municipalities are allowing to happen to our lake and its water. I am tired of every thing I see that is a clear affront to the lake and its water being "OK" or "permitted" or the "land owner's right to use his land."" It does not matter what affront to the safety of the lake water you bring to their attention - clear cutting, silt fences that are not properly installed or maintained, road side ditches that are not vegetated after being cleaned, over expansion of access to nature areas without adequate protection of the water, vegetation, etc and it does not matter who you voice your concern to If you get any response at all and often you only speak to a receptionist, the answer is always pretty much "it is ok". So instead of preventive maintenance and protection you are just planning a way to deal with the aftermath of not carrying our preventive maintenance and protection. Using a not well confirmed for use on this lake Chemical instead of doing the hard work of protecting the lake Very sad

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 11:12:28 PM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
I also think the City of Syracse needs to direct whatever infrastructure funding is required to repair its leaking water distribution facilities and stop the major wasting of Skaneateles lake water that occurs every day.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 11:04:23 PM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 10:59:42 PM

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Map It <https://protect2.fireeye.com/v1/url?k=a56eb4a4-faf58c63-a56c4d91-000babd9f75c-70292c8df2040a71&q=1&e=b23e12bb-7ef7-4662-a3c0-3c65c8986aa7&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 10:55:30 PM

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Map It <https://protect2.fireeye.com/v1/url?k=c0f22d07-9f69143d-c0f0d432-ac1f6b44fec6-c9f8cb7f01b87c8b&q=1&e=ea1c98ba-28b7-4b83-a455-2245aadc163a&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNew%2BYork%2B13152>

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Additional comments
Way too immature to make a decision like this. So much harm could be caused with Earth Tec

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 10:44:15 PM

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Map It <https://protect2.fireeye.com/v1/url?k=48ef97ca-1774af17-48ed6eff-0cc47aa8c6e0-dfed812c8c5c0d13&q=1&e=21359d7b-5731-4b19-979c-d83d8c05c471&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D15%2BKane%2BAve%252C%2BSkaneateles%2B13152>

Additional comments

This must be a scientifically based assessment with the necessary baseline studies. It is frightening to think of the possible side effects on one of the most pristine lakes in our state, maybe even the entire US! Clean clear Water is precious and must not be taken for granted!

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 10:12:45 PM

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Additional comments
I agree with the decisions of the SLA

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 10:06:26 PM

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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
Please postpone approval of the proposed permit until verified information and data is provided via the internet and media to the public and SLA regarding prior usage/application of the Earthtec algicide including dates, persons to contact, locations, legal actions, health complaints, pre-usage/application goals and objectives, and post-usage/application assessments and evaluations.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 9:58:40 PM

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Additional comments

I do NOT support the position of the SLA regarding the limited use of copper sulfate in Skaneateles Lake that the City of Syracuse is proposing. In fact, I'd support much more widespread use of copper sulfate, as it was used until 1980, when it was occasionally used along both the east and west shores.

The history of the use of copper sulfate in the watershed seems to have been largely forgotten by most current residents. I haven't forgotten. It was widely used near shores to combat algae blooms until about 1980. It had a long history of safe use for the prior 20 years.

While I obviously support the other efforts to maintain clean water in Skaneateles, especially a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed, it is a painful fact that at this time, copper sulfate is the only known cost effective treatment for cyanobacteria. Plus much of what you are requesting of the City of Syracuse to provide is not necessary going to improve, or help, in the immediate term, when the water is undergoing another bloom.

What I'd like to know is this: Does the SLA have any specific proof that the previous use of copper sulfate from about 1960 to about 1980 had any negative impact on Skaneateles Lake? Or on any other lake or large body of water?

If so, you should present that data immediately. Otherwise, I oppose the SLA's position on this.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 9:55:14 PM

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Map It <https://protect2.fireeye.com/v1/url?k=e5b20ba0-ba293367-e5b0f295-000babd9f75c-985d65544dcac783&q=1&e=e15de572-aee9-474f-8983-2f1a86ac793e&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DHomer%252C%2BNY%2B13077>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 9:50:51 PM

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Kathryn Coughlin
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Map It <https://protect2.fireeye.com/v1/url?k=6f720fd3-30e93714-6f70f6e6-000babd9f75c-b1690b0918d4459b&q=1&e=d92a6771-473c-4c21-ae5e-222ae3db03ff&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

Additional comments
I drink the water from Skaneateles lake and I hope that you can find another way of treating Algal Blooms.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 9:05:26 PM

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43 Fire Lane 13D, Moravia, NY 13118
Map It <https://protect2.fireeye.com/v1/url?k=2e20b794-71bb8e9a-2e224ea1-0cc47aa88e08-58a00d225651993c&q=1&e=e828672a-3eaa-4f08-a246-a24f8e61f22b&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D43%2BFire%2BLane%2B13D%252C%2BMoravia%252C%2BNY%2B13118>

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 8:57:38 PM

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Sara Buhl
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Map It <https://protect2.fireeye.com/v1/url?k=0185f62b-5e1ecf14-01870f1e-000babda0031-68efa7d591eabc28&q=1&e=508006ae-3d7b-4cfb-9c91-ed4e0a75348c&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 8:56:52 PM

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Mary L Gardner
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Map It <https://protect2.fireeye.com/v1/url?k=56061ba4-099d22b5-5604e291-000babd9fe9f-178b7f320908eac0&q=1&e=48171a4c-c463-4e6e-ad8d-1297ded31bca&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D81%2BW.%2BElizabeth%2BSt.%252C%2BNY%2BSkaneateles%2B%2B%2B%2B13152>

Additional comments
Over many many years, the SLA had demonstrated scientific and practical excellence, commitment, and tenacity in providing leadership and stewardship of Skaneateles Lake. I trust their wisdom in this case. I am confident that all concerned parties can work together to resolve these differences.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 8:52:51 PM

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Map It <https://protect2.fireeye.com/v1/url?k=1ce71d4f-437c247d-1ce5e47a-000babd905ee-e85b4291a7cf58a9&q=1&e=3a054f3b-5256-4268-a0b3-1f943267eb63&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DHomer%252C%2BNY%2B13077>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 8:52:39 PM

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 8:50:45 PM

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Map It <https://protect2.fireeye.com/v1/url?k=c546aa3d-9add932c-c5445308-000babd9fe9f-85cf6385c8f19323&q=1&e=6d0dfc38-89a0-4b53-b79d-eaea4f8f9ca7&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D56%2BEast%2BElizabeth%2BStreet%252C%2BSkaneateles%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
Your interest in addressing this issue is appreciated!

But this tactic at this time is unwise. Please listen to the locals on this. Thank you for your attention!

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 8:44:35 PM

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Map It <https://protect2.fireeye.com/v1/url?k=35639b69-6af8a256-3561625c-000babda0031-7a5915029a237aa9&q=1&e=bae10ede-65d6-488d-96bf-5a7e882fa9ba&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DMoravia%252C%2BNY%2B13118>

Additional comments

As a resident on Skaneateles Lake, I am very concerned about the use of algicide. Skaneateles Lake is one of the cleanest lakes in the country, and I can safely drink and recreate in the water. Please do not risk contaminating our water with poisonous chemicals.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 8:43:07 PM

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Katie Meyers
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Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 8:41:49 PM

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Additional comments
Please do not approve the use of EarthTec algicide on Skaneateles Lake. The safety of our water is too important. We can not afford to poison our water.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 8:41:13 PM

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To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 8:32:34 PM

Name
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Map It <https://protect2.fireeye.com/v1/url?k=ee90a259-b10b9b1e-ee925b6c-000babd9fa3f-006bc96107a50edc&q=1&e=6e5e5c80-6adf-4059-bfb5-35a5599223ba&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 8:25:02 PM

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Map It <https://protect2.fireeye.com/v1/url?k=e28813db-bd132ae1-e28aeaee-ac1f6b44fec6-abc183cbe80aa192&q=1&e=fc8af3c0-6271-43ce-8625-7000c925982c&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D3756%2Bhighland%2Bave%252C%2BSkaneateles%252C%2Bny%2B13152>

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Additional comments
we need more info on this process before you make a decision like this, our community uses this as drinking water and our children swim in this lake. find another way!

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 8:22:47 PM

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12 Academy St, Skaneateles 13152
Map It <https://protect2.fireeye.com/v1/url?k=8b8d03c1-d4163ae5-8b8ffaf4-000babd9f8b3-1a1cea47b667aad4&q=1&e=bfc7f9d0-1c1d-4a98-9ddd-b68254055295&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D12%2BAcademy%2BSt%252C%2BSkaneateles%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

Additional comments
SLA's recommendations are prudent and scientifically based. I have been a resident here since 1968, and I have been swimming the lake every summer since 1961. This lake deserves the utmost in care and stewardship. It is an invaluable resource and will become even more so in a future where water will be a scarce resource. What we decide to do now will impact the lake for years to come!

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 05, 2021 8:22:46 PM

Name
lynne gregory
Email
amylynnegrg@aol.com <mailto:amylynnegrg@aol.com>
Address
marcellus, NY 13108
Map It <https://protect2.fireeye.com/v1/url?k=2bfd8e25-7466b6f8-2bff7710-0cc47aa8c6e0-2487eab14bf1fde3&q=1&e=3ef952ef-c1f8-40a5-8605-6dc29dac9d07&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3Dmarcellus%252C%2BNY%2B13108>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 8:21:47 PM

Name
lisa Cartwright
Email
lcartwright1074@gmail.com <mailto:lcartwright1074@gmail.com>
Address
3756 highland ave, Skaneateles, NY 13152
Map It <https://protect2.fireeye.com/v1/url?k=222ebca3-7db585e4-222c4596-000babd9fa3f-39dace7df41edc5d&q=1&e=3ff305d0-7422-4312-bf81-18ffad0d27a6&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D3756%2Bhighland%2Bave%252C%2BSkaneateles%252C%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
please don't contaminated our drinking and beautiful lake. it's one of the cleanest lakes in the country. find another way to address the problem.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 8:21:37 PM

Name
Aster weddings
Email
asterweddings@yaho.com <mailto:asterweddings@yaho.com>
Address
2595 benson rd, Skaneateles 13152
Map It <https://protect2.fireeye.com/v1/url?k=f99f3581-a6040cbb-f99dccb4-ac1f6b44fec6-f67fb3c9640cac2d&q=1&e=7b77d334-7c69-4593-96b7-7c466511dc10&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D2595%2Bbenson%2Brd%252C%2BSkaneateles%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments
As a supporter of SLA I was alarmed when I heard about the potential chemical treatment. I'm happy to hear that SLA agrees that this treatment should be avoided. Any and all measures to prohibit the growth of algae blooms from the start should be considered before a potentially harmful chemical to the biome of the lake.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 8:03:40 PM

Name
Neal Houser
Email
NHouser@kellyhillco.com <mailto:NHouser@kellyhillco.com>
Address
2520 Wave Way, Skaneatlese NY13152
Map It <https://protect2.fireeye.com/v1/url?k=e1cde833-be56d174-e1cf1106-000babd9fa3f-9bee64464d6ecf5b&q=1&e=f3915cfe-a86d-404a-8443-c28936ba923d&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D2520%2BWave%2BWay%252C%2BSkaneatlese%2BNY13152>

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 7:55:13 PM

Name
Caitlin Fields
Email
caitlin.v.fields@gmail.com <mailto:caitlin.v.fields@gmail.com>
Address
81 Spafford Landing Road, Homer 13077
Map It <https://protect2.fireeye.com/v1/url?k=d2b54684-8d2e7fc3-d2b7bfb1-000babd9fa3f-1feb4a85c56d0eda&q=1&e=46b0176e-93d3-4b77-a494-f21aaf28e4a6&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D81%2BSpafford%2BLanding%2BRoad%252C%2BHomer%2B13077>

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From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 05, 2021 7:53:43 PM

Name
Timothy ODonnell
Email
tim.odonnell1954@gmail.com <mailto:tim.odonnell1954@gmail.com>
Address
Homer, NY 13077
Map It <https://protect2.fireeye.com/v1/url?k=005a9afa-5fc1a3eb-005863cf-000babd9fe9f-02509626726761b4&q=1&e=6e998455-bd6d-4eb8-bd14-03803d4b5a77&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DHomer%252C%2BNY%2B13077>

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Monday, July 26, 2021 11:23 AM
To: Hanson, Karyn D (DEC)
Subject: FW:

FYI

-----Original Message-----
From: 3154270911@vzwpix.com <3154270911@vzwpix.com>
Sent: Saturday, July 24, 2021 7:37 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>; 3154367480@icmms1.sun5.lightsurf.net
Subject:

Please do not allow use of this chemical in skaneateles lake. The cure could be worse than the disease. Thank you. Linda t cohen
1910 west lake road, Skaneateles.

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Monday, July 26, 2021 11:22 AM
To: Hanson, Karyn D (DEC)
Subject: FW: Using Earth tec on Skaneateles Lake

FYI

From: Mary Torrisi <marytorrisi@me.com>
Sent: Saturday, July 24, 2021 1:09 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: Using Earth tec on Skaneateles Lake

Sent from my iPhone
I am not in favor of you using Earth tec in Skaneateles Lake. The lake is our source of drinking water after being filtered and going through a UV light. I enjoy swimming everyday in the lake.
I feel that a lot more information needs to be looked into by scientist before something like this is poured into our lake. What are the side effects?
There are too many unknowns! Do not dump chemicals into the lake. I will take my chances with nature and drink bottled water if a HAB occurs.
Mary Torrisi

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Monday, July 26, 2021 11:23 AM
To: Hanson, Karyn D (DEC)
Subject: FW: AGAINST Syracuse's use of EarthTec algicide

FYI

From: Andrew Paullin <andrew.paullin@gmail.com>
Sent: Sunday, July 25, 2021 9:26 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: AGAINST Syracuse's use of EarthTec algicide

Dear Ms. Hanson:
As an owner together with my family and Mark Byrne of Byrne Dairy, of over 600 feet of lake front property for nearly 120 years, we strongly oppose the use of this chemical, or any chemicals, to clean the water in Skaneateles Lake. More must first be done to eliminate the root cause of the HABs, which is Nitrogen in agricultural run off from large dairy farms in the Skaneateles Lake watershed. These farms should first be publicly named, so consumers can understand the direct connection between the milk they purchase at the grocery store, the resulting pollution in Skaneateles Lake, and the HABs. This public service education effort has yet to happen. There are many environmentally safe farming practices which need to occur. Working together we can restore the Lake's health without the use of chemicals (regardless of the type of chemical, or how "safe" people try to portray that it is).
Furthermore, the City of Syracuse can construct a water treatment facility before dumping chemicals into Skaneateles Lake.
As one of the cleanest lakes in the world historically, as a whole community we should be embarrassed that we are having this conversation and even considering dumping chemicals into Skaneateles Lake. Yes I understand this chemical treatment has happened in the past years ago, but that doesn't mean it should continue.
Organizations like the Finger Lakes Land Trust and the Skaneateles Lake Association are working hard to help keep the lake clean, and should be further supported.
Thank you very much for your prompt attention to this matter and denying this permit.
Sincerely,
Andrew Paullin
414-212-5372
The Pines
1948 Pine Grove Road South
Borodino

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Monday, July 26, 2021 1:50 PM
To: Hanson, Karyn D (DEC)
Subject: FW: Application of Earthtech in Skaneateles Lake

FYI

-----Original Message-----
From: Jane Cummings <cummings.jane5@gmail.com>
Sent: Monday, July 26, 2021 1:41 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: Application of Earthtech in Skaneateles Lake

I do NOT want chemicals added to Skaneateles Lake which could be potentially harmful to the total ecosystem. This chemical as I understand it will kill off the fish in the area. What's the potential for it to affect humans & our drinking water. This needs further review before it's approved!!!
Jane Cummings

Sent from my iPhone

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Tuesday, July 27, 2021 4:29 PM
To: Hanson, Karyn D (DEC)
Subject: FW: Copper sulfate

FYI

-----Original Message-----
From: Christine Delmonico <kitsy7104@icloud.com>
Sent: Tuesday, July 27, 2021 4:14 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Cc: kitsy7104@yahoo.com
Subject: Copper sulfate

I'm a resident of south Florida but grew up on Skaneateles Lake and want to make a statement about copper sulfate. Lakes in my backyard were dosed with this dangerous chemical and causing the death of many native plants and killed so many animals. The cost to take the waste away very costly and maybe it'll never be the same. Don't go this route. Nearby communities have stopped using fertilizer for their homes, a much better approach. Christine Delmonico 10504 nw7th ct Plantation Fl33324

Sent from my iPhone

Sent from my iPhone

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Tuesday, July 27, 2021 12:25 PM
To: Hanson, Karyn D (DEC)
Subject: FW: Public Comment to Draft Permit...City of Syracuse...Skaneateles Lake

Importance: High

FYI

From: Kay Kraatz <kskraatz@hotmail.com>
Sent: Tuesday, July 27, 2021 11:29 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>; Kay Kraatz <kskraatz@hotmail.com>
Cc: jaaron@townofskaneateles.com; Mayor@villageofskaneateles.com
Subject: Public Comment to Draft Permit...City of Syracuse...Skaneateles Lake

I understand that you have given tentative approval to apply chemicals to kill toxic algae in Skaneateles Lake.
You are taking comments until August 13th

I **disapprove** of this action. EarthTec contains a 20% solution of copper sulfate. What is the lasting affect of the use of this chemical?
What is the life span?
The city of Syracuse uses the water….what about the residents of Skaneateles that draw water form the lake? There are 4,487 people with 1.065 lakefront homes and others that draw from the lake.

Kay Kraatz
E Lake Rd, Skaneateles
315-685-6256
Sent from Mail for Windows 10

Winters, Catherine G (DEC)

From: dec.sm.DEPPermitting
Sent: Tuesday, July 27, 2021 12:25 PM
To: Hanson, Karyn D (DEC)
Subject: FW: Public Comment to Draft Permit...City of Syracuse...Skaneateles Lake

Importance: High

FYI

From: Kay Kraatz <kskraatz@hotmail.com>
Sent: Tuesday, July 27, 2021 11:33 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Cc: jaaron@townofskaneateles.com; Mayor@villageofskaneateles.com
Subject: RE: Public Comment to Draft Permit...City of Syracuse...Skaneateles Lake

Note:

Product - EarthTec
earthtecwatertreatment.com › product
EarthTec can be used to replace copper sulfate. Many customers have been using copper sulfate for years to treat unwanted algal blooms in the late spring and throughout the summer. The problem is copper sulfate crystals sink, so much of the copper is wasted and settles to the bottom. It also requires an extensive labor campaign to apply the product.

Sent from Mail for Windows 10

From: Kay Kraatz
Sent: Tuesday, July 27, 2021 11:29 AM
To: deppermitting@dec.ny.gov; Kay Kraatz
Cc: jaaron@townofskaneateles.com; Mayor@villageofskaneateles.com
Subject: Public Comment to Draft Permit...City of Syracuse...Skaneateles Lake

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Kay Kraatz

E Lake Rd, Skaneateles
315-685-6256
Sent from Mail for Windows 10

From: Kay Kraatz
To: dec.sm.Comment.Skaneateles2021
Subject: Against EarthTec use of algicide
Date: Monday, February 28, 2022 12:45:54 PM

I am opposed to the use of algicide by EarthTec into Skaneateles Lake.

I have a concern for the copper levels in the sediment and it's impact on the water quality and aquatic life.

I draw my water supply from Skaneateles Lake. I am a resident of the Town of Skaneateles

Kay S Kraatz
315-685-6256

Sent from Mail for Windows

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Wednesday, July 28, 2021 1:41 PM
To: Hanson, Karyn D (DEC)
Subject: FW: Skaneateles Lake

FYI

From: Donna Giambartolomei <sandro2000@aol.com>
Sent: Wednesday, July 28, 2021 12:20 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: Skaneateles Lake

I believe an information meeting for the community should be held. This does not seem like a good idea to me, although I have no information on the product. Why would you choose to do this in a drinking water source?

Take Care
Donna Giambartolomei, a Skaneateles resident

What is given by the land should return to the land.

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Friday, July 30, 2021 8:56 AM
To: Hanson, Karyn D (DEC)
Subject: FW: copper sulfate to curb HABS in Skaneateles Lake

FYI

From: Judy Freeman <lakesideauburn@gmail.com>
Sent: Thursday, July 29, 2021 6:26 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: copper sulfate to curb HABS in Skaneateles Lake

Ms. Hanson:
I am concerned about the plans to put copper sulfate into Skaneateles Lake which is the source of drinking water for so many. I am writing to encourage your agency to provide much more information to the communities involved about the use of copper sulfate and any possible long term side effects. In addition, there should be a local governance board involved with authority to protect the Skaneateles watershed.
Judith Freeman
79 Lakeshore Drive
Auburn, NY 13021

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Tuesday, August 10, 2021 2:30 PM
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application # 7-3150-00112/00004

Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA
Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 06, 2021 10:04 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
David Jones
Email
djones82@twcny.rr.com
Address
7 Ridgeview Avenue, NY 13045 Map It
Additional comments
Please be sure of the long term effects of this product on the entire eco system before applying it to our lake.

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Tuesday, August 10, 2021 2:29 PM
To: Hanson, Karyn D (DEC)
Subject: FW: Skaneateles Lake

Importance: High

FYI

-----Original Message-----
From: JAMES RICHRDSON <jertawian@aol.com>
Sent: Friday, August 06, 2021 10:04 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: Skaneateles Lake

1)effective immediately no lawn care products on any property within the Skaneateles lake watershed including fertilizers and pesticide/herbicides.
2) eliminate the use of fertilizers and pesticides on crops farmers plant within the lake watershed.
These two policy changes may help mitigate the HAB problem. This year the lake has had plenty of fresh water so if there was ever a year that we do not need such drastic measures it is this year yet some people are claiming there is a problem. We must look to the source and it is obvious that the above issues must be the underlying problem.
James Richardson

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Saturday, August 21, 2021 12:27:20 AM

Name
Shirley Eagan
Email
ww05@aol.com <mailto:ww05@aol.com>
Address
94 Firelane 16A, Moravia, NY 13118
Map It <https://protect2.fireeye.com/v1/url?k=21f3f0f9-7e68c83e-21f109cc-000babd9f75c-4f4ebc8042851932&q=1&e=e36a4801-3923-407c-adc2-750d6d5e2965&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D94%2BFirelane%2B16A%252C%2BMoravia%252C%2BNY%2B13118>

Additional comments
This needs careful consideration and much study. At this time I would oppose taking this action.

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Saturday, August 21, 2021 7:45:40 AM

Name
Rose Gay
Email
cloudbank7@gmail.com <mailto:cloudbank7@gmail.com>
Address
Skaneateles, NY 13`152
Map It <https://protect2.fireeye.com/v1/url?k=673e5bbf-38a562b1-673ca28a-0cc47aa88e08-815c49d892f61b36&q=1&e=5fff4d1d-4b2d-45ba-b526-6bb54063ea5e&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13%2560152>

Additional comments
This is NOT the time to rush into a treatment protocol that could cause other short and long term problems for the lake. This IS the time to regulate logging especially clearcutting on the hillsides that surround the lake. With STRONG support from NYSDEC, NYSDOH, City of Syracuse and SLA (YES, SLA too) it is possible that citizens can work with their Town Boards around the watershed to enact local laws re: specific types of logging in the watershed. Because of the severe rain effects that continue to occur, many feel that the distance of concern from the waterline up the steep slopes should be expanded.

From:	skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To:	dec.sm.DEPPermitting
Subject:	New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Saturday, August 21, 2021 2:15:39 PM

Name
James Tuozzolo
Email
jimtuozzolo@gmail.com <mailto:jimtuozzolo@gmail.com>
Address
Skaneateles, New York 13152
Map It <https://protect2.fireeye.com/v1/url?k=5f7521ce-00ee1909-5f77d8fb-000babd9f75c-9624a72d1a10ed86&q=1&e=2ceb8cb5-d1d2-439c-a23a-c9dc52478304&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNew%2BYork%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

Additional comments
We are very fortunate to have the dedication of such highly qualified individuals that volunteer their time as members of SLA. Their objective is to protect the quality of the lake and to insure it remains a save drinking water supply to the many individuals throughout the County that rely on the water from Skaneateles lake. I support their recommendations.

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: Comment on Syracuse permit for pesticide in Skaneateles Lake
Date: Friday, August 13, 2021 9:10:07 AM
Importance: High

FYI

From: Jeff LaMarca <jeff@marcelluscapital.com>
Sent: Thursday, August 12, 2021 11:26 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Cc: rabbott@syrgov.net
Subject: Comment on Syracuse permit for pesticide in Skaneateles Lake

Dear Ms. Hanson,

I live in the village of Skaneateles. I strongly urge the NYS DEC to deny the City of Syracuse's request for a permit to dump copper sulfate pentahydrate ("EarthTec") into Skaneateles Lake.

Skaneateles Lake is one of the cleanest lakes in the country because of its small watershed area relative to water volume. Unfortunately, the lake is not as clean as it once was. Runoff of fertilizers and other pollutants from farms, homes, and deforested areas has raised nutrient levels and damaged the ecosystem of the lake. And recreational boaters have been allowed to introduce invasive aquatic species into the lake. These factors, combined with warmer lake water temperatures due to global warming, have led to occasional blooms of harmful cyanobacteria.

This is obviously a problem for both the City of Syracuse and the Village of Skaneateles, who use the lake as a source of drinking water. But my understanding is that the City of Syracuse has the authority to regulate land use, fertilizer use, waste disposal, development and many other activities within the watershed that are causing the HAB problem. Have both the City of Syracuse and the NYS Department of Environmental Conservation done everything they possibly can to protect and preserve the ecosystem of Skaneateles Lake and prevent the conditions that cause HABs? Now that our lake has been polluted with runoff and invasive species, Is polluting it further with copper sulfate pentahydrate the only option? Does anyone know what the unintended consequences, and the long-term effects, of spiking our lake with "EarthTec" might be?

I would like to see the City of Syracuse and the DEC take a long-term, preservation-based approach to Skaneateles Lake's water quality, rather than a short-term, chemical-based approach. I would also like the City and the DEC to hold a public meeting to discuss the proposed application of copper sulfate pentahydrate to the lake.

Sincerely,
Jeff LaMarca

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 13, 2021 9:10:29 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Thursday, August 12, 2021 12:24 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Jeff LaMarca

Email

JEFF@MARCELLUSCAPITAL.COM

Address

Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

Additional comments

I live in the village of Skaneateles. I strongly urge the NYS DEC to deny the City of Syracuse's request for a permit to dump copper sulfate pentahydrate ("EarthTec") into Skaneateles Lake.

Skaneateles Lake is one of the cleanest lakes in the country because of its small watershed area relative to water volume. Unfortunately, the lake is not as clean as it once was. Runoff of fertilizers and other pollutants from farms, homes, and deforested areas has raised nutrient levels and damaged the ecosystem of the lake. And recreational boaters have been allowed to introduce invasive aquatic species into the lake. These factors, combined with warmer lake water temperatures due to global warming, have led to occasional blooms of harmful cyanobacteria.

This is obviously a problem for both the City of Syracuse and the Village of Skaneateles, who use the lake as a source of drinking water. But my understanding is that the City of Syracuse has the authority to regulate land use, fertilizer use, waste disposal, development and many other activities within the watershed that are causing the HAB problem. Have both the City of Syracuse and the NYS Department of Environmental Conservation done everything they possibly can to protect and preserve the ecosystem of Skaneateles Lake and prevent the conditions that cause HABs? Now that our lake has been polluted with runoff and invasive species, Is polluting it further with copper sulfate pentahydrate the only option? Does anyone know what the unintended consequences, and the long-term effects, of spiking our lake with "EarthTec" might be?

I would like to see the City of Syracuse and the DEC take a long-term, preservation-based approach to Skaneateles Lake's water quality, rather than a short-term, chemical-based approach. I would also like the City and the DEC to hold a public meeting to discuss the proposed application of copper sulfate pentahydrate to the lake.

Sincerely,
Jeff LaMarca

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Wednesday, August 11, 2021 11:49:50 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Tuesday, August 10, 2021 5:50 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Mary Hearn

Email

maryhearn34@gmail.com

Address

Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

Additional comments

I am STRONGLY against the use of algicide in Skaneateles Lake at this time. The State should spend more time investigating other treatment technologies that will preserve the health of the lake and its ecosystem. The State should focus on treatment solely within the drinking water processing and delivery system ; ie after the drinking water has been drawn out of the Lake - and not dump algicide into the lake. I fear that use of this algicide product will have unintended negative consequences on human health, and the health of Central New York’s beautiful ecosystem. Thank you.

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Wednesday, August 11, 2021 11:50:28 AM
Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Tuesday, August 10, 2021 8:33 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
Arnold Rubenstein
Email
arniebbd@aol.com
Address
Skaneateles, NY 13066 Map It
Additional comments
I vote no on adding algicide Earth Tec into Skaneateles Lake.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Tuesday, August 10, 2021 3:33:37 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Tuesday, August 10, 2021 3:25 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Susan Wulff

Email

SueAnneW@aol.com

Address

2746 East lake rd, Skaneateles 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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Additional comments

I strongly oppose the use of this algicide in the lake. I think there are too many uncertainties and other options have not fully been explored yet.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 12, 2021 9:28:12 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Wednesday, August 11, 2021 9:25 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Diane and Mark Aberi

Email

aberid@aol.com

Address

56 Leitch Ave, Skaneateles NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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Additional comments

We strongly oppose the use of chemicals to treat algal blooms in Skaneateles Lake. One of the many benefits of the Skaneateles Lake Association is that it takes the time to thoroughly research in order to determine what is best for both our lake and for the environment. This chemical application could have dire consequences on the lake’s ecosystem as well as on our local economy if something happens to our pristine lake. There have been other lakes in the surrounding Finger Lakes region which have used similar methods involving chemicals to combat the milfoil problem. As a result, they were not as successful as the SLA’s natural method, and caused harmful disruptions to the ecosystems of those lakes. Because the SLA used a more natural albeit time consuming method, it has really paid off, and we would like the same opportunity to explore other options with the least amount of consequences. Treating chemicals with more chemicals doesn’t seem like the best way to beat algal blooms. Please allow for scientific experts to study this matter before something drastic happens that would effect our most precious resource. Thank you for your consideration of this urgent matter.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 12, 2021 9:27:39 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Wednesday, August 11, 2021 7:17 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

James Taylor IV

Email

taylorman7867@yahoo.com

Address

2958 east lake rd, Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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Additional comments

Absolutely contradicts the duty of the DEC. DEC stands for “Department of Environmental Conservation,” not “what’s better for the people consuming it.” This is ludicrous.

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Wednesday, August 11, 2021 11:51:17 AM
Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Tuesday, August 10, 2021 10:17 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
Patricia Carey
Email
pattielainecarey@gmail.com
Address
1021 Autumntree Court, NY Skaneateles, 13162 Map It
Additional comments
That is my drinking water! It is basically unfiltered. We have already learned, too late, about the dangers of the introduction of chemicals in other aspects of life and many of us have family who suffered from cancer of unknown origins. The algae is not a big problem every year so why would we routine apply chemicals that will stay in the system.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 13, 2021 9:10:07 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Thursday, August 12, 2021 12:21 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Audrey Van Voolen

Email

dravv@skanpsych.com

Address

Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments

Very strongly oppose this action being taken. You are trying to solve a problem of pollution with more pollution. Emphasis needs to be on greater restrictions in the watershed, eg, limits on building/land use, prohibition of jet skis etc. This action is trying to be put through very quietly before the public can be aware of what is happening.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:03:07 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 9:42 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
Christina Castle
Email
tinatugboat@yahoo.com
Address
Skaneateles, NY 13152 Map It
Additional comments
Please please rethink this. We need more BENIGH treatmeny

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 13, 2021 4:55:13 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 3:37 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Mark Drastal

Email

mdrastal@aol.com

Address

Skaneateles, NY 13152
Map It

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Additional comments

I am shocked to find that the proposed solution for clean drinking water for the City of Syracuse, is to put a poison in the pure Source of it's water. This idea is similar to the 'swimming pool' method.....Adding chlorine and bromine to the water. Does anyone drink swimming pool water? No.
I'm not sure of all the types of water purification plans that currently exist, but poisoning the Source is not very scientific.
-Whatever methods the City of Syracuse uses currently, are done after the water leaves the Source. Why should this scenario be any different.
-Poisoning the lake is not a very target specific approach. We could never be sure the poison affects the desired area. It may miss it's target completely. Current methods used successfully in Skaneateles Lake are very targeted (submerged mats).
-Almost all Skaneateles lake residents derive their drinking water directly from the lake. I would not like to be consuming any chemicals added to my drinking water. Would you?
-Any City of Syracuse water employees, in favor of this method of purification, should be required to add a diluted mixture of copper sulfate into the water supply of their own home, for an extended period of time to make sure the solution is safe. Any volunteers? I didn't think so.
-What is the method to determine when the chemicals have been completely eliminated from the Skaneateles water Source?

There are too many unanswered questions for a group of semi-knowledgeable professionals to 'wing-it' with our very rare, pure water supply. What unintended consequences will we have to live with, if anyone here is mistaken?

Thank you. Mark Drastal

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:00:21 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 5:28 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Bob Honold

Email

honold@gmail.com

Address

56 East Elizabeth Street, Skaneateles 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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Additional comments

Your interest in addressing this issue is appreciated!

But this tactic at this time is unwise. Please listen to the locals on this. Thank you for your attention!

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:01:11 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 9:35 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Emily Konrad

Email

emilyhole@hotmail.com

Address

2019 Woodland Lane, Skaneateles New York
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments

Please protect this lake! Do NOT allow this band aid solution (EarthTec) to “fix” the alga bloom problem. Let’s find a way to do this safely, keeping the environment and the lake eco system at the forefront of all conversations and solutions. Let’s be a model that other communities can follow when facing this issue.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:05:16 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Saturday, August 14, 2021 8:40 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Kristopher Konrad

Email

krkonrad11@gmail.com

Address

2019 Woodland Lane, Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments

There must be a better solution, than dumping harmful chemicals into our beloved lake.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:05:35 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Saturday, August 14, 2021 10:20 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Diane Maguire

Email

maguire.diane@gmail.com

Address

Skaneateles, New York 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments

Are drinking water for our house comes from the lake and we want this issue to be thoroughly vetted before it's done

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:05:02 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Saturday, August 14, 2021 2:50 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Girard Purdy

Email

gtppurdy@gmail.com

Address

Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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Additional comments

I take my drinking water directly from the lake like many others who live on the lake and oppose any chemicals that are place in the lake.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:04:44 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Saturday, August 14, 2021 7:47 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
Richard Ward
Email
sandgita440@gmail.com
Address
Skaneateles, NY 13152 Map It
Additional comments
There must be a better way.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:05:55 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Saturday, August 14, 2021 10:36 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Cristy Winkelman

Email

winkscj@gmail.com

Address

Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

Additional comments

Please listen to those of us that truly love every aspect of this lake and have for our entire lives. Thank you!

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Monday, August 16, 2021 11:06:38 AM
Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 15, 2021 12:08 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Edward McGraw

Email

mcgraw@ashleymcgraw.com

Address

PO Box 976, New York Skaneateles, 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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Additional comments

Skaneateles Lake is a precious and delicate ecosystem. Let’s be sure we take our time and get all the information needed to do this right. HAB will come and go, but we do not want to permanently harm the watershed and the lake.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 19, 2021 8:37:32 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Wednesday, August 18, 2021 4:36 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Lindsay Groves

Email

linzgrov@gmail.com

Address

1246 Minnow Cove (mail-PO Bx 930), Skaneateles NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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Additional comments

How could you not try other strategies first?

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 26, 2021 1:20:11 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Thursday, August 26, 2021 12:43 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

John Formoza

Email

jformoza@gmail.com

Address

8741 Radburn drive, Baldwinsville New York. 13027
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 26, 2021 10:38:55 AM
Importance: High

FYI - From the Junk folder.

-----Original Message-----
From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> On Behalf Of Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Thursday, August 26, 2021 10:29 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Name
Donna Hogan
Email
dohogan3@aol.com <mailto:dohogan3@aol.com>
Address
1674 Amerman Road, NY 13152
Map It <https://protect2.fireeye.com/v1/url?k=bdcb007c-e2503946-bdc9f949-ac1f6b44fec6-898351b6d6f85666&q=1&e=ef6f5bf4-1044-4a29-8879-90e96ea5dc54&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D1674%2BAmerman%2BRoad%252C%2BNY%2B13152>

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

* I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

Additional comments
More research and testing needs to be done. Once a chemical like this is introduced to the lake it may be harmful and irreversible. What are the health consequences to those who use the lakes drinking water? Too many questions ...postpone until there are definitive answers

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Tuesday, August 10, 2021 2:26 PM
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application # 7-3150-00112/00004

Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA
Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 06, 2021 7:22 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
Paul Torrisi Jr
Email
paul.torrisi@morganstanley.com
Address
41 E Elizabeth st, Skaneateles Ny Map It

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Tuesday, August 10, 2021 4:26:46 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Tuesday, August 10, 2021 3:45 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Richard Haswell

Email

rhaswell20@gmail.com

Address

13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Wednesday, August 11, 2021 11:50:51 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Tuesday, August 10, 2021 9:13 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Jessica Millman

Email

jessicacogan@yahoo.com

Address

6 W Lake St, Skaneateles 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Wednesday, August 11, 2021 11:50:07 AM
Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Tuesday, August 10, 2021 6:04 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Janet Winkelman

Email

winkelman.janet7@gmail.com

Address

2488 Howe rd, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Tuesday, August 10, 2021 3:33:19 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Tuesday, August 10, 2021 3:07 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Sheila Haswell

Email

shaswell36@hotmail.com

Address

77 East Genesee Street, Skaneateles 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 12, 2021 9:27:55 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Wednesday, August 11, 2021 7:22 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Peter Babbles

Email

petebabbles@hotmail.com

Address

Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, August 12, 2021 9:27:24 AM
Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Wednesday, August 11, 2021 7:12 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Sarah Babbles

Email

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Address

3052 E Lake Road, Skaneateles New York
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 12, 2021 9:07:42 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Wednesday, August 11, 2021 2:25 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Brian Fischer

Email

fischerwbrian@gmail.com

Address

3882 East St, Skaneateles NY
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 12, 2021 9:07:59 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Wednesday, August 11, 2021 2:28 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Kathleen Fischer

Email

kfis265659@aol.com

Address

1251 Longview shores, Skaneateles ny 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 12, 2021 9:05:03 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Wednesday, August 11, 2021 1:39 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Leanna Fischer

Email

leanna444@gmail.com

Address

Skaneateles, NY 13152
Map It

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 13, 2021 9:10:07 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Thursday, August 12, 2021 10:42 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Jean Babbles

Email

krebbles@hotmail.com

Address

2704 E Lake Road, Skaneateles NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, August 12, 2021 9:28:58 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Thursday, August 12, 2021 7:40 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Joseph Delmonico

Email

jd@delmonicoinsurance.com

Address

Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:03:47 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 11:21 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Kimberly Alvarez

Email

kimkalvarez@gmail.com

Address

Albany, New York 12208
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 13, 2021 4:55:28 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 3:46 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

August Arroyo

Email

august.arroyo@hotmail.com

Address

1034 Butters Farm Ln, Skaneateles NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From: A Arroyo
To: dec.sm.Comment.Skaneateles2021
Subject: Skaneateles Lake
Date: Wednesday, March 2, 2022 2:25:53 PM

opposed to NYSDEC approving a permit allowing the algicide EarthTec to be used on Skaneateles Lake.

Best Regards,

August Arroyo
August.Arroyo@hotmail.com
(201) 888-0920

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 13, 2021 4:52:49 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 2:42 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Elizabeth Etoll

Email

eretoll@gmail.com

Address

Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:03:25 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 10:05 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Samir Mahadin

Email

s.mahadin30@gmail.com

Address

1789 East Lake Rd, Skaneateles 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 13, 2021 4:54:57 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 3:21 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Roberta Ripberger

Email

Rripberger2@gmail.com

Address

Skaneateles, New York 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:00:56 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 8:03 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

James Strodel

Email

tykestrodel@yahoo.com

Address

12900 Westmoreland Farm Road, Davidson NC
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 10:59:47 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 5:08 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Neil Strodel

Email

nbstrode@gmail.com

Address

6 Teasel Lane, Skaneatles NY 13153
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Friday, August 13, 2021 2:23:50 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 2:14 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Patricia Troisi

Email

pdickeytroisi@aol.com

Address

2221 Sunset Cove, Skaneateles New York 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From: PATRICIA TROISI
To: dec.sm.Comment.Skaneateles2021
Subject: Earthtec treatment of Skaneateles Lake
Date: Tuesday, March 1, 2022 6:37:09 PM

There has not been enough research done to justify this treatment. I would like to see more data about the impact, both short-term and long-term, of this treatment. I believe it has been used in smaller bodies of water. I would like to be assured that it is not harming our lake. I understand it is not at all clear that this treatment will be safe at this time.
Thank you.

Sent from my iPhone

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:00:38 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Friday, August 13, 2021 6:09 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Susan Troup

Email

Troupsusan@gmail.com

Address

Pittsford, NY 14534
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Tuesday, August 17, 2021 10:17:28 AM
Importance:	High

FYI – Now that I know these are OK I am forwarding them. There are two more.

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Saturday, August 14, 2021 4:38 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
Hadley Narins
Email
hnarins@gmail.com
Address
24 east st, Skaneateles NY/13152 Map It

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Monday, August 16, 2021 11:04:22 AM
Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Saturday, August 14, 2021 7:41 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Janet Stokoe

Email

jgstokoe@comcast.net

Address

142 Ridings Drive. Homer, NY 13077
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:07:15 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 15, 2021 4:14 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Richard Boni

Email

sammirab1@gmail.com

Address

1300 Sailboat Way, Skaneateles 13153
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:06:10 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 15, 2021 11:28 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Ellen Lutz

Email

ellen@ellenlutz.com

Address

138 Ridings Drive, Homer NY 13077
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Tuesday, August 17, 2021 10:18:55 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Monday, August 16, 2021 10:29 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
JOE CALIPARI
Email
jcalipari@yahoo.com
Address
55 Jordan St #110, NY Skaneateles Map It

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Tuesday, August 17, 2021 10:19:13 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Monday, August 16, 2021 11:56 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
Terry and Bob DeWitt
Email
rwd3038@aol.com
Address
1853 W Lake Rd, Skaneateles, NY 13152 Map It

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 16, 2021 11:07:47 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Monday, August 16, 2021 9:25 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Sheryl Szlosek

Email

sszlosek@aol.com

Address

Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Wednesday, August 18, 2021 9:30:30 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Wednesday, August 18, 2021 9:29 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

wendy maclachlan

Email

beachdog13@aol.com

Address

MARCELLUS, New York 13108
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 23, 2021 12:58:49 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 22, 2021 11:19 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Mary Gaffney

Email

marykengaf@gmail.com

Address

2442 Wave Way, Skaneateles NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Monday, August 23, 2021 1:01:02 PM
Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 22, 2021 10:12 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Email

jltuoz@yahoo.com

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 23, 2021 1:01:20 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 22, 2021 10:17 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

scott johnston

Email

sdjohnston@gmail.com

Address

2111 Terrace Lane S, Skaneateles 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 23, 2021 1:00:44 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 22, 2021 10:08 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Jolie Johnston

Email

joleswtj@gmail.com

Address

5102 Reis Circle, Fayetteville NY 13066
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 23, 2021 1:00:04 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 22, 2021 9:52 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Email

Lakeville1@aol.com

Address

116 East Genesee Street, New Yok Skaneateles. 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland

Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 23, 2021 12:59:46 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 22, 2021 7:31 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Scott Moe

Email

scottlmoe@gmail.com

Address

41 Park Place, Apt. 4, Brooklyn, New York 11217
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 23, 2021 12:59:07 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 22, 2021 6:43 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Rick Nicklas

Email

rpnicklas@optonline.net

Address

Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Monday, August 23, 2021 12:59:27 PM
Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 22, 2021 7:29 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Jennifer Tuozzolo

Email

jtuozzolo@gmail.com

Address

41 Park Place, Apt. 4, Brooklyn, New York 11217
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, August 23, 2021 1:00:25 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, August 22, 2021 10:01 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
Karen Woodworth
Email
kbwrex@aol.com
Address
Rochester, New York 14625 Map It

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Tuesday, August 24, 2021 1:40:53 PM
Importance: High

FYI - Was in the Junk Folder.

-----Original Message-----
From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> On Behalf Of Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Monday, August 23, 2021 3:54 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
Elizabeth Madden
Email
madden712@gmail.cm <mailto:madden712@gmail.cm>
Address
Skaneateles, NY 13152
Map It <https://protect2.fireeye.com/v1/url?k=b5383832-eaa30108-b53ac107-ac1f6b44fec6-c532ea4cfd7b30b0&q=1&e=755223bd-a2d3-4662-878c-ff56f5f9ae26&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3DSkaneateles%252C%2BNY%2B13152>

From: skanbfkr@server228.web-hosting.com on behalf of Support of SLA Position re: Permit Application #7-3150-00112/00004
To: dec.sm.DEPPermitting
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Wednesday, August 18, 2021 4:38:14 PM

Name
RICHARD TACKLEY
Email
JTACK7542@aol.com <mailto:JTACK7542@aol.com>
Address
1809 RUSSELLS LANDING, NEW YORK SKANEATELES 13152
Map It <https://protect2.fireeye.com/v1/url?k=8cc2da22-d359e306-8cc02317-000babd9f8b3-325e9d2dd925d50f&q=1&e=8bf8fd51-d712-4704-9bfb-28c5d404a430&u=http%3A%2F%2Fmaps.google.com%2Fmaps%3Fq%3D1809%2BRUSSELLS%2BLANDING%252C%2BNEW%2BYORK%2BSKANEATELES%2B13152>

Hanson, Karyn D (DEC)

From: dec.sm.DEPPermitting
Sent: Tuesday, August 10, 2021 2:25 PM
To: Hanson, Karyn D (DEC)
Subject: FW: Copper sulfate in Skaneateles

Importance: High

FYI

-----Original Message-----
From: Ellen Warner <ebwarner_99@yahoo.com>
Sent: Thursday, August 05, 2021 8:43 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: Copper sulfate in Skaneateles

The water quality has gone downhill since this was discontinued years ago. It is the right thing to do in my opinion.

Sent from my iPhone

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: Comments on draft SPDES permit for Earthtec treatment of Skaneatles Lake
Date: Friday, October 1, 2021 1:59:32 PM
Importance: High

FYI

From: Richard Preall <rpreall@gmail.com>
Sent: Thursday, September 30, 2021 1:24 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: Comments on draft SPDES permit for Earthtec treatment of Skaneatles Lake

Ms. Karyn Hanson,

It is my understanding, based on participation at a Zoom meeting in August, that the comment period for the draft SPDES permit by the City of Syracuse to utilize Earthtec to treat waters of Skaneateles Lake was extended to September 30, 2021. So I hope you will accept the following.

I am representing the Central New York Chapter of the Izaak Walton League.
We support the Skaneateles Lake Association's opposition to the draft permit and wish to add our further concerns. As a bit of personal background and insight on my knowledge of these matters I will add that I am a retired NYSDEC Senior Aquatic Biologist and was a certified aquatic pesticide applicator for 25 years with extensive work on sea lamprey control efforts in Lake Champlain and rotenone applications on 40+ public and private waters. I also was involved in the environmental review of a copper sulfate application on Lake Pleasant in Hamilton County (it did not go well).

The Central New York Chapter of the Izaak Walton League supports the Skaneateles Lake Association's opposition to the Earthtec application proposed by the City of Syracuse. In addition to the concerns expressed by the Association we note the following:

1. The draft permit allows treatments at water temperatures of 60.8 F or higher in inshore waters. Rainbow trout will inhabit near shore areas at such water temperatures and are known to be acutely sensitive to copper sulfate. Chronic exposure to low levels of Earthtec (which may remain in suspension up to two weeks) may therefore cause delayed mortality in trout and other sensitive fish species. There is no provision in the draft permit for monitoring such potential mortality.
2. Treated lake waters will outlet to Skaneateles Creek, a popular trout stream stocked with rainbow trout. Trout in the stream will have no way to evade chronic exposure to copper sulfate. The draft permit does not address monitoring of possible impacts to Skaneateles Creek.
3. Treatment levels proposed in the draft permit are likely to kill zebra and quagga mussels now present in large densities in much of the lake. The visual monitoring of biological impacts only during application will not see impacts to these populations. There will be no way to judge if mortality is excessive...which would result in fouled water, smells and impacts on animal populations which utilize mussels for food and shelter.
4. There appear to be no studies done of native mussels, snails and other molluscs which could be

present in the lake and be harmed by this application. Many native mussel species are classified as rare, endangered or of special concern in New York State.

5. The 48 hour notification period prior to treatment is too short, especially for contacting all possible riparian users. The Earthtec label specifies that riparian users should not be present on the water during application.... will this result in lake closures to boating/fishing etc and for how long? Will the NYSDEC launch be closed during treatments?

6. The monitoring of microcystis levels only at three beach locations is insufficient. Riparian users swimming off their docks or boats could conceivably be exposed to high levels well away from the beaches. More lakewide sampling is needed.

7. A treatment plan for the lake is due only AFTER the SPDES permit is approved. Further, that plan does not have to undergo public review. While such actions may be legal under department regulations neither action seems appropriate for this high public interest project. This is simply poor politics and will not incur good will among affected user groups.

8. The environmental review process for this treatment of a very large public waterbody seems woefully inadequate. DEC Fisheries spent years studying and planning for lampricide treatments on Lake Champlain and the Finger Lakes. Bypassing such processes by classifying this lake as a public water supply and therefore not subject to regular Article 15 review is preposterous.

Thank you for your consideration of our concerns,
Richard Preall
Central New York Chapter Izaak Walton League

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Friday, October 1, 2021 1:49:11 PM
Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Thursday, September 30, 2021 12:46 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Richard Preall

Email

rpreall@gmail.com

Address

5020 Phaeton Lane, New York Syracuse 13215
Map It

Additional comments

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to the Earthtec application proposed by the City of Syracuse. In addition to the concerns expressed by the Association
we note the following:
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on fish populations which utilize mussels for food and shelter.

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appropriate for this high public interest project. This is simply poor politics and will not incur good will among affected
user groups.

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, September 13, 2021 11:53:09 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Saturday, September 11, 2021 9:12 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Nicki Danforth

Email

ndanforth1@yahoo.com

Address

28 Leitch Ave, Skaneateles NY
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

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From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, September 13, 2021 11:53:28 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Saturday, September 11, 2021 11:48 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Linda Pietroski

Email

lpietroski@roadrunner.com

Address

Skaneateles, NY 13152
Map It

Additional comments

Based on what I have seen and read I feel there are too many unknowns and not enough research on what the long terms effects of algicide EarthTec can have on Skaneateles Lake. Once it goes in it can never be removed!

Linda Pietroski

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Monday, September 13, 2021 11:53:45 AM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Sunday, September 12, 2021 6:15 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
Melissa Zell
Email
mfzell@gmail.com
Address
1265 oak bluff, Skaneateles NY Map It

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Monday, September 13, 2021 11:54:04 AM
Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of** Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Monday, September 13, 2021 10:03 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name
Fouad Dietz
Email
fouad.dietz@gmail.com
Address
2773 East Lake Road Skaneateles, NY 13152 Map It
Additional comments
We are extremely concerned about the water that we drink from the lake and swim in might be treated with a chemical that no one can provide 100% safety assurances on. A cavalier approach to the safety of lake resident drinking and bathing water is not what is needed to treat this problem. Unless 100% assurances of safety of this chemical is to drink and bathe in is available, it should not be used.

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date: Thursday, September 23, 2021 8:47:03 AM
Importance: High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Wednesday, September 22, 2021 10:16 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

Jayne Melrose-Smith

Email

jmelrose.smith@gmail.com

Address

PO box 842 Skaneateles, NY 13152
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

Additional comments

Letter to follow. Need correct email for Karyn Hanson, please.
Send to:
jmelrose.smith@gmail.com

From:	Jayne Melrose-Smith
To:	Hanson, Karyn D (DEC)
Subject:	Re: comment letter for SPDES permit
Date:	Sunday, September 26, 2021 6:53:46 PM
Attachments:	image001.png image002.png image003.png image004.png

Attn: Karyn Hanson

I attended the virtual meeting held at noon on Sept 16, 2021 regarding the proposed use of EarthTec in Skaneateles Lake for the control of Microcystis cyanobacteria, and appreciate the time and effort of the presenters in providing an education regarding this important topic. I live on the lake 6 months of the year, and it is my treasured “front yard”. While I am all for doing what is best for the future of our lake, I believe there is much more information needed. There should be careful consideration of all possible impacts on our lake, and consideration of alternatives, before moving forward with a product like EarthTec.
Thoughts from attending the virtual meeting:

- I did not hear of any other comparative body of water using this product during the presentation, and don’t believe we should “trial” the effects on Skaneateles Lake.
- I believe that copper will persist in the sediment, and remain concerned about cumulative effects of toxicity to aquatic life forms and the lake’s ecosystem.
- I believe the Woodland Reservoir would be a possible starting point for considering initial EarthTec treatment, and/or other considerations such as ultrasound. I do not believe enough knowledge/research has been acquired to use the EarthTec product on the open waters of our lake.
- In reading the initial proposal, I read that all treatment would halt if “fish kills” were noted. But if that happens, you are already too late.

I oppose the NYSDEC permitting the City of Syracuse’s use of EarthTec algicide in Skaneateles Lake until further research can be gathered, and Statements/Requests/Recommendations of the Skaneateles Lake Association, of which I am a member, can be fully addressed.

Sincerely,
Jayne Melrose-Smith

Mailing address:
PO Box 842

Skaneateles, NY 13152

Physical address:
137 Hemlock Hollow
Moravia, NY 13118

phone: 703-868-7701

On Thu, Sep 23, 2021 at 8:54 AM Hanson, Karyn D (DEC) <Karyn.Hanson@dec.ny.gov> wrote:

> Jayne Melrose-Smith,
>
> I am the contact person for comments regarding the City of Syracuse's SPDES application. I received your statement of support for SLA's position on the draft permit. In the additional comments section, I saw "Letter to follow. Need correct email for Karyn Hanson, please."
>
> The comment period is open through October 1, 2021. Please feel free to send me any comments or letters via email or US mail.
>
> Regards,
>
> Karyn
>
> **Karyn Hanson**
>
> Environmental Analyst, Division of Environmental Permits
>
> **New York State Department of Environmental Conservation**
>
> 625 Broadway, Albany, NY 12233
>
> P: (518) 408-5476 | karyn.hanson@dec.ny.gov
>
> www.dec.ny.gov | | | 


NEW
YORK
STATE
Department of
Environmental
Conservation

From:	dec.sm.DEPPermitting
To:	Hanson, Karyn D (DEC)
Subject:	FW: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004
Date:	Thursday, September 23, 2021 1:20:55 PM
Importance:	High

FYI

From: skanbfkr@server228.web-hosting.com <skanbfkr@server228.web-hosting.com> **On Behalf Of**
Support of SLA Position re: Permit Application #7-3150-00112/00004
Sent: Thursday, September 23, 2021 11:36 AM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: New submission from Public Comment on City of Syracuse SPDES Algicide Permit Application #7-3150-00112/00004

Name

John McDevitt

Email

john@mcdevittsculpture.com

Address

34 Fire Lane 12C, Moravia NY, 13118
Map It

Statement of Support for SLA Position on City of Syracuse EarthTec Permit

- I support the Skaneateles Lake Association regarding the following statement: The Skaneateles Lake Association: • strongly opposes at this time the NYSDEC permitting the City of Syracuse the ability to introduce the algicide EarthTec into Skaneateles Lake. • requests that the NYSDEC postpones determination on the permit request until significant concerns outlined in this comment can be adequately addressed by the City of Syracuse, NYSDEC, EarthTec, and the appropriate scientific community. • requests that more information be provided regarding the selection of EarthTec and assessment of other alternatives if any. • has concerns about the risks associated with treating Microcystis cyanobacteria with a product such as EarthTec that could remain in the lake's ecosystem over time. • requests more information from an entity such as the Environmental Protection Agency on the potential impacts on a water body from EarthTec • recommends that there is further investigation regarding what the impacts are to other similar bodies of water with similar application. • requests information on the long term risks and threats not only to humans, but also to how the application of EarthTec could impact the lake's ecosystem. • recommends that there be more time for scientists familiar with Skaneateles Lake and Microcystis to confer with scientists at EarthTec to better understand potential impacts together before a determination is made to allow for the use of EarthTec. • recommends that the City of Syracuse provides more details regarding the treatment protocol of applications and monitoring operations. • requests that

information is provided on how the treatment application is incorporated into a well-established and vetted emergency action plan. • recommends a continued assessment of the strategy of applying technologies like ultrasound and products such as EarthTec into the Woodland Reservoir as opposed to the open waters of Skaneateles Lake. • recommends that a baseline of copper in the existing sediment be established prior to any potential further introduction into Skaneateles Lake. • recommends that the NYSDEC provides other specific visual biological impact examples to look for beyond fish kills to trigger the cessation of the application of EarthTec. • recommends that there be a sufficient operations, maintenance, and monitoring plan associated with the proposed treatment system. • recommends a stronger response of enforcement from the NYSDEC, NYSDOH, and City of Syracuse regarding the greater need for more stringent protections in our watershed. • requests that the NYSDEC and the City of Syracuse to co-host an informational meeting for the public to have a venue to learn more on this issue and be given the opportunity to engage in a dialogue with experts and decision makers relative to the proposed permit application. • requests that the NYSDEC and City of Syracuse continue to invest in and expedite the development of more benign treatment technologies, products, and strategies in the management, mitigation, and prevention of Harmful Algal Blooms.

Additional comments

Let’s focus on fixing the causes of the water quality. Thank you.

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: Skaneateles Lake Earth Tec Application
Date: Thursday, September 16, 2021 1:43:37 PM
Importance: High

FYI

From: Fouad Dietz <fouad.dietz@gmail.com>
Sent: Thursday, September 16, 2021 12:32 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: Skaneateles Lake Earth Tec Application

Hi There,

As a SKaneateles Lake resident that draws my water from the lake, I am concerned about the quality of water that I drink and use to bathe that I draw from the lake.

Is this treatment safe to drink and bathe from and in and is it safe for our pets who swim in the lake?

How will we be notified for when treatments will take place?

PLease remember that we drink this water too directly from the lake.

Thank You,

Fouad Dietz
2773 E Lake Rd, Skaneateles, NY 13152

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: Skaneateles Lake
Date: Thursday, September 30, 2021 11:18:36 AM
Importance: High

FYI

From: tom damico <tomdamico1@gmail.com>
Sent: Monday, September 27, 2021 4:35 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: Skaneateles Lake

I have lived on the lake for over 40 years, I donate to the Skaneateles Lake Association annually through my neighborhood association, and I am entirely in favor of applying Copper Sulfate to the lake water to control algal blooms. It is my understanding from talking to neighbors who have lived on the lake for well over 50 years that copper sulfate was routinely used each year to prevent algal growth. According to them the method of application was aerial spraying. They believe the practice was stopped in the 1970s due to an overabundance of caution when pressure was applied by environmental groups. However, copper sulfate would seem to be less of an environmental concern than the toxins released by the algal blooms of recent years. As someone who remembers how pristine the lake water used to be, I urge the approval of the use of copper sulfate to improve the quality of the lake to a level that is closer to what it used to be. Tom D'Amico, 1290 Sailboat Way

From: dec.sm.DEPPermitting
To: Hanson, Karyn D (DEC)
Subject: FW: Use of Earth Tec copper sulfate in Skaneateles Lake
Date: Friday, September 24, 2021 4:27:49 PM
Importance: High

FYI

From: tom rhoads <trhoads789@gmail.com>
Sent: Friday, September 24, 2021 3:59 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: Use of Earth Tec copper sulfate in Skaneateles Lake

Please enter my concerns in the record for the proposed permit regarding the above subject matter. I do not believe it is appropriate to use copper sulfate as an algicide in my drinking water source.

In addition to potential copper exposure to my potable water, at my home, served by the Village of Skaneateles system, I do not want the lake ecology damaged by this very toxic chemical application.

While there is mention of fish kills not being allowed, I believe that the food chain and desired aquatic species will all be subjected to harm by such a broad spectrum poison.

Algae blooms are reported by the DEC as related to lawn chemicals in the Skaneateles watershed. Please work with the city and towns to remove excess Phosphorous from the lake in lieu of dose with copper sulfate. Eliminate lawn fertilizers in thevwatershed. Test all septic systems in the watershed much more frequently. Reduce/stop all new impervious surface expansion in the watershed. Restore repairian buffers and stop lawn and rockwall use right up to the waterline. Restore shade tree planting at the water edge. If roundup is decomposing into soluable Phosphorous and able to be taken up by algae, then stop its use in the watershed.

The lake ecology is remarkable, to name just a small fraction of its features, it has a tremendous fishery, marvelous and prolific mayfly populations, and is frequented by all sorts of resident and migratory birds and bats. I fear the proposed chemical dose will have lasting negative impacts on these critical natural resources. Copper sulfate is highly toxic to many aquatic species. It has chronic as well as acute toxicity.

Please change your direction on the draft permit to use an acute and chronic toxin on this tremendous natural resource.

Respectfully,

Tom Rhoads
19 Hannum St

Skaneateles, NY
13152

From:	Julie Abbott-Kenan
To:	Hanson, Karyn D (DEC)
Cc:	Tracy, Elizabeth A (DEC); Marko, Matthew J (DEC); Sheeley, Scott E (DEC); Webb, Stephanie H (DEC)
Subject:	Re: DEC PESTICIDE APPLICATION PERMIT
Date:	Tuesday, September 14, 2021 4:16:30 PM
Attachments:	image001.png image002.png image003.png image004.png

HI, Everyone!

After speaking directly with Syracuse Mayor Ben Walsh, I'm really encouraged, in the interest of transparency, that the City has now agreed to hold a public info session this coming Thurs., 9/16/21 at noon via zoom facilitated by Cornell Cooperative Extension. Our local leaders have a great respect for Camille Marcotte who will be running it, as do I.

After reviewing the application in its entirety, I have questions regarding the process that I've sent to Camille to be answered at the meeting, however I felt the need to share directly with you as well. Thanks very much for reviewing the following:

- On page 5...under "special conditions" it states the City will develop the Pesticide Management plan, one month *after* the issuance of the permit and it will be kept "in-house"(not submitted).
- Do you feel the Skaneateles Lake shareholders can effectively comment without actually seeing the Pesticide Management Plan beforehand?
- What is the actual process and parameters for spraying, and is there anything you can share with regards to any draft Pesticide Management Plan?
- In the interest of transparency, why wouldn't the Pesticide Management Plan be submitted to the DEC beforehand? Wouldn't it be prudent for the plan to be submitted to DEC for review? Why keep it in house?

My interest is open dialogue\communication\transparency on behalf of my communities as well as any potential environmental impacts to this glorious watershed. Have a great day!

Your Truly,

Julie Abbott-Kenan
Onondaga County Legislator, District 6, Skan. Village lakefront homeowner in potentially named pesticide application area

On Wed, Aug 11, 2021 at 12:21 PM Hanson, Karyn D (DEC) <Karyn.Hanson@dec.ny.gov> wrote:

Dear County Legislator Abbott-Kenan,

I was forwarded your email of August 2nd regarding the City of Syracuse's proposed use of EarthTec in Skaneateles Lake. In addition to whatever response the City may provide to your inquiry, this is to let you know that I am the DEC contact person for the draft SPDES permit currently out for public notice and comment (link to notice: https://www.dec.ny.gov/enb/20210714_reg7.html). You and any members of the public are welcome to send any written comments to my attention. Please be advised that DEC will accept comments on the draft permit through the close of the comment period on August 27, 2021. For reference, the draft permit and fact sheet are also attached here.

Regards,

Karyn

Karyn Hanson

Environmental Analyst, Division of Environmental Permits

New York State Department of Environmental Conservation

625 Broadway, Albany, NY 12233

P: (518) 408-5476 | karyn.hanson@dec.ny.gov

www.dec.ny.gov | | |

From: Julie Abbott-Kenan <julieabbottkenan@gmail.com>
Sent: Monday, August 2, 2021 10:57 AM
To: Rich Abbott <rabbott@ci.syracuse.ny.us>; Mayor <Mayor@villageofskaneateles.com>
Cc: TrusteeZapata <TrusteeZapata@villageofskaneateles.com>; TrusteeEriksen <TrusteeEriksen@villageofskaneateles.com>; Trustee Evans <trusteeevans@villageofskaneateles.com>; Trustee Lynn <trusteelynn@villageofskaneateles.com>; jaaron@townofskaneateles.com
Subject: DEC PESTICIDE APPLICATION PERMIT

Hello, Rich & Mary,

I am checking in to see when and where you are planning to hold the public information sessions as previously discussed, regarding the City's application to apply Earthtec for emergency use in response to algal blooms.

Many of my shareholders and neighbors have concerns and questions, as do I as a village lakefront home owner.. Thanks so much for facilitating this community discussion and partnership.

Best,

Julie Abbott-Kenan

Onondaga County Legislator, District 6

From: Tacie Anderson
To: dec.sm.Comment.Skaneateles2021
Subject: Skaneateles Lake
Date: Sunday, February 27, 2022 6:53:46 PM

Please do NOT put algicide in Skaneateles Lake. We are vehemently opposed to that. It will be harmful in so many ways. Our water pump is in the lake and we do not want algicide loaded with copper in our water supply. We have spent over 30 years advocating for the protection of Skaneateles Lake. You should be doing the same.

Sincerely,
Tacie and Roland Anderson
Skaneateles

Sent from my iPhone

From: Robert Liegel
To: dec.sm.Comment.Skaneateles2021
Cc: Torrisi, Paul, M.D.; Frank Moses
Subject: Proposed application of earth tec in Skaneateles Lake
Date: Monday, February 28, 2022 10:52:31 AM

I'm a lawyer, resident of the Town of Skaneateles, a board member of the Skaneateles Lake Association, Inc. and we draw our water directly from the lake. Please consider this as a comment to the proposed application that legal action will be initiated to halt the proposed application because I believe it would harm water users and the lake ecology. Please respond to this comment. Robert Liegel

From: Emily Konrad
To: dec.sm.Comment.Skaneateles2021
Subject: Don"t use EarthTech on Skaneateles Lake
Date: Tuesday, March 1, 2022 9:17:13 PM

To Whom It May Concern,
I am sending the below on behalf of my daughter.

Hi, my name is Maeve, I've grown up going to Skaneateles Lake and I treasure every moment created on the water whether it's sailing, water skiing, swimming, or tubing. I feel very strongly about the preservation of the lake and keeping it safe for me and others to have fun in. The chemicals you are debating whether or not to put into the lake would destroy not only the lake, but our lake life and hold me back from having fun. The use of EarthTech will hurt humans, and it will also hurt wildlife and habitats of many animals. Please do not permit the use of EarthTech on Skaneateles Lake.

Thank you,
Maeve Konrad

From: Tom McKeown
To: dec.sm.Comment.Skaneateles2021
Subject: reject City of Syracuse current Skaneateles Lake application
Date: Tuesday, March 1, 2022 4:51:23 PM

I understand that the City of Syracuse is submitting an application to obtain a permit to apply the algicide EarthTec to Skaneateles Lake. As someone who has enjoyed boating on the lake for more than 30 years, I am very concerned about the risks of this application without further study.

I understand that the algicide is harmful to fish, and that it contains an amount of copper that does not break down and accumulates in sediment.

This lake is simply a jewel, and I worry about any action that could cause harm without complete assurances in advance that no harm will be caused. The current application of the City of Syracuse does not appear to meet that standard.

Sincerely,
Tom McKeown
57 Lake Vista Drive
Skaneateles, NY 13152

From: Christine Delmonico
To: dec.sm.Comment.Skaneateles2021
Subject: Skaneateles lake
Date: Tuesday, March 1, 2022 8:50:57 PM

My husband and I have lived in Skaneateles for 40 years. The heart of our community is the lake , it is a unique body of water that we need to protect. I would hope that you would not allow this application of an algicide. The long term effects are not clear and it will possibly do irreparable damage to the ecosystem.
Not to mention being the source of drinking water for so many people, the possible contamination is not known.
Please do not allow this permit to be granted.
Thank you.
Christine Delmonico

From: Deborah Hole
To: dec.sm.Comment.Skaneateles2021
Subject: Industrial State Discharge Elimination System (SPDES) Permit Skaneateles Lake
Date: Tuesday, March 1, 2022 8:17:59 PM

I attended the hearing tonight hosted by the DEC and want to say thank you for the opportunity to participate in this discussion. I also want to add additional comments here.

In considering this permit which will affect Skaneateles Lake, the following concerns have come to mind and need to be addressed responsibly and with caution:

- Applying algicide DOES NOT treat the causes of the algal bloom.
- Copper sulphate is toxic to humans, to fish and other aquatic life.
- Copper sulphate is not biodegradable.
- Oklahoma State University Division of Agricultural Sciences and Natural Resources with the Cooperative Extension Service states" "If copper sulphate or other herbicide are the only management tool used on algae, it typically grows back rapidly." (OSU NREM-9218 Dec 2019)

- According to an Illinois State Water Survey, a Division of the Department of Energy and Natural Resources, "algal regrowth may occur within a very short period after algicide treatment. "Management plans should include qualitative assessments of taste and odor problems, periodic monitoring, alkalinity testing and alternate methods of dealing with water quality problems should be explored prior to chemical treatment of a lake. (isms.illinois.edu)
- Why risk the long term health of Skaneateles Lake? What is the cost to benefit ratio? Is the risk of unintended consequences worth it?
- Referring to the permit, exactly how are all those people drinking and using Skaneateles Lake water going to be notified in 48 hours?
- Why does the permit refer to notifying "the NYSDEC of any visual evidence of biological impacts, including fish kills, during treatment?"

The bottom line is that there are more questions than answers here. EarthTec's own master label refers to fish kills. In addition, a management plan to include who, what, when, where, and why should be determined prior to any permit application approval. Put the brakes on this approach, listen to the people who live here and consider longer term solutions to the bloom problem. Easy answers do not solve difficult problems.

Thank you.
Deborah Hole
2023 Pine Blf
Skaneateles, NY 13152

EarthTec 64962-1 SAL20200617 Draft Label MASTER LABEL Risk Mitigation Label Review 12 21 2020

[Note to Reviewer: Bracketed language and graphics are optional.]

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. As soon as possible, wash thoroughly and change into clean clothing.
- Wash the outside of gloves before removing

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and aquatic invertebrates. Waters treated with this product may be hazardous to aquatic organisms.

Fish Advisory Statement: This copper product is toxic to fish and aquatic organisms. Unlike most organic pesticides, copper is an element and will not break down in the environment and will therefore accumulate in sediment with repeated applications. Copper is a micronutrient, but its pesticidal application rate exceeds the amount of copper needed as a nutrient.

SOURCE: US Environmental Protection Agency—2-3-21 EarthTec MASTER LABEL

https://www3.epa.gov/pesticides/chem_search/ppls/064962-00001-20210203.pdf

From: Jane Cummings
To: dec.sm.Comment.Skaneateles2021
Subject: March 1st Hearing re: Algicide use in Skaneateles Lake
Date: Tuesday, March 1, 2022 8:22:40 PM

We are expressing a strong objection to the use of this algaecide/copper sulfate in Skaneateles Lake.
We support the SLA's position on this issue! They have many professionals who have spent countless hours studying & researching this topic finding many reasons to NOT use this product in our lake.
There are too many unanswered questions as to the safety of this product & we do NOT want Skaneateles to be used as an experiment when it is a major drinking source for our community & the greater Syracuse area.
Sincerely,
Jane & Bill Cummings
2356 W. Lake Rd
Skaneateles, NY
(315) 415-1919

From: MARYBETH CARLBERG
To: dec.sm.Comment.Skaneateles2021
Subject: Support for using earthtek for treating Skaneateles Lake
Date: Tuesday, March 1, 2022 7:23:34 PM

I am a family practice physician and member of the Skaneateles Lake Association and have a camp near carpenters point.
I feel very safe with earthtec used as directed and as discussed at the public information session held in October and hosted in part by Rich Abbott from the city of Syracuse. He discussed how Skaneateles Lake has been treated multiple times in the past since 1950 with copper and used at much greater concentrations in order to clear fungal blooms. It is my understanding that various copper products are used in organic farming of fruit/vineyards and its added to our vitamins.

However, there are several things that I **am** sure of.

I am sure that the toxins that are the degradation products of blue-green allergy are **very** dangerous. BMAA is a neurotoxin produced by all bluegreen algae. In a couple fascinating YouTube videos, titled “ALS: fishing for answers” and “Diet and ALS”, Dr. Michael Greger discusses in 5 minutes reports about the concerns of their relationship to chronic neurologic disorders such as ALS, Alzheimers and parkinsons. And they accumulate and concentrate in marine life.

In any case,What I **know** is that my husband has been swimming in the lake for many many years and for the past few notices as early as July particulate matter in the water column that was never present before. What I **know** is my friend who routinely flies over all the involved fingerlakes noted 2 years ago in early August algal trails behind motorboats that stretched from mandanna to miles south . What **I know** is that I just spent $11,000 drilling a 350 foot well at our Skaneateles camp because I am now afraid to drink the water directly from the lake.

HAB’s are only going to get worse given our climate crisis. They are a devil we **know** Versus one that is theoretical ie- copper sulfate. I also do not know what our other options are. I only wish they would bring some down to my end of the lake!

From:	Marietta Bolster
To:	dec.sm.Comment.Skaneateles2021
Subject:	SPDES Permit Application for Skaneateles Lake
Date:	Tuesday, March 1, 2022 3:23:49 PM

Hello,

We are writing on behalf of our family and town, as residents of Skaneateles. Together, we would like to ask the New York State Department of Environmental Conservation to deny or indefinitely postpone consideration of the City of Syracuse's permit application for use of the algicide EarthTec in Skaneateles Lake.

Our greatest concern is the lack of research demonstrating the overall efficacy and—more importantly—long-term environmental impacts of copper sulfate pentahydrate and metallic copper treatment on similar lake ecosystems.

Given that there is no satisfactory data or case studies have been provided covering a) the long-term effects on humans or pets exposed through ingestion of lake water, swimming and recreational activities, etc.; b) long-term effects on aquatic life, lake oxygen levels, etc.; or c) the potential need for reapplication, etc. in the face of rising average temperatures and increased agricultural/residential nutrient runoff, the approval of this application would be, at best, irresponsible.

The potential adverse impact to the ecological and financial well being of the community and the region as a whole is extremely detrimental, we ask again that you deny the application at this time.

Your time and consideration is deeply appreciated.

Marietta & Thomas Bolster
Skaneateles, New York

Marietta B. Bolster
Designer
PATIENCE BREWSTER BY MACKENZIE-CHILDS
mbolster@mackenzie-childs.com

From: Carrie Ryan
To: dec.sm.Comment.Skaneateles2021
Subject: Skaneateles Lake
Date: Tuesday, March 1, 2022 8:38:13 PM

Dear NYS DEC Director,

I am a home owner on Skaneateles Lake and have loved the lake since coming here as a baby 50 years ago. I strongly object to the use of EarthTec in Skaneateles Lake. This is an unproven mitigation and can cause much more harm than good in our lake. The package insert on the box contains many warnings:
1) CAUSES IRREVERSIBLE EYE DAMAGE
2)HARMFUL IF SWALLOWED
3)TOXIC TO FISH
4)SIGNIFICANT REDUCTION TO AQUATIC LIFE

It is also AGAINST FEDERAL LAW to use this product that could result in the death of an endangered species or modification of their habitat. We have plenty of bald eagles in our area. As you may know bald eagle was designated endangered in the late 1960s but after the BAN on DDT they recovered from the brink of extinction.

WE DO NOT WANT THIS TO HAPPEN AGAIN. We draw water directly from the lake for our drinking water. We only use only a UV system and it has served us well. We do not want any harmful chemicals in our lake and drinking water.

Sincerely,
Carrie Conroy Ryan
2514 Lakewatch Lane
Skaneateles, NY 13152

From: Mary Hearn
To: dec.sm.Comment.Skaneateles2021
Subject: Use of EarthTec Algicide in Skaneateles Lake- Attn. Ms Karyn Hanson
Date: Tuesday, March 1, 2022 4:49:14 PM

Ms. Hanson,

We are writing to urge the NY State Department of Environmental Conservation (DEC) to DENY the City of Syracuse's application to use the pesticide EarthTec in Skaneateles Lake, for the following reasons:

1. When we read the excerpt from EarthTec's label, and see "this product is toxic to fish and aquatic animals," based on US Environmenal Protection research results, it seems obvious to us that it should not be used in Skaneateles Lake. Although the product might be useful in man-made reservoirs, such as New York's Catskill reservoirs or Massachusetts' Quabbin, it is not appropriate for use in Skaneateles Lake. Our Lake Skaneateles is not a reservoir, but a multi-use eco-system, supporting a rich variety of plant and aquatic life, in addition to serving as the source of our drinking water and recreational use. Significantly more research would need to be done in order to confidently support using EarthTec in our lake.

2. Since the City's proposal is to apply EarthTec only to the north end of Skaneateles Lake, the result could well be damage to its ecosystem, with no remediation of blue-green algae in the rest of the lake. Why should the plant and animal life of the lake be harmed if blooms continue to affect the rest of the lake, where other drinking water intake pipes exist? Our lake would end up worse off than before, with a damaged ecosystem and limited or nonexistent benefits to drinking water purity.

Although we understand the detrimental effects of cyanobacteria and microcystins, it does not make sense to destroy plant and aquatic life in Skaneateles Lake to yield safe drinking water — and there are reasons to question whether or not the City's plan would even be fully effective as proposed.

For the above and other reasons, we ask that the DEC reject the City of Syracuse's application for the application of EarthTec in Skaneateles Lake.

Thank you,

Mary S. Hearn
Michael C. Hearn
(315) 730-6520

10 Prentiss Drive
Skaneateles, NY 13152

From: Kate Ryan
To: dec.sm.Comment.Skaneateles2021
Subject: SPDES Permit Application for Skaneateles Lake
Date: Tuesday, March 1, 2022 3:40:02 PM

To whom it may concern,

As residents of the town of Skaneateles, we strongly urge the New York State Department of Environmental Conservation to deny or indefinitely postpone consideration of the City of Syracuse's permit application for use of the algicide EarthTec in Skaneateles Lake.

Among the many compelling reasons for denial of this application (including insufficient data on immediate aquatic-life impact, indeterminate preexisting levels of elemental copper in Skaneateles Lake sediment, and the lack of a post-application monitoring plan), we are most concerned about the startling lack of literature or case studies demonstrating the overall efficacy and—more importantly—long-term environmental impacts of copper sulfate pentahydrate and metallic copper treatment on similar lake ecosystems.

Given that no satisfactory data or case studies have been provided covering a) the long-term effects on humans or pets exposed through ingestion of lake water, swimming and recreational activities, etc.; b) long-term effects on aquatic life, lake oxygen levels, etc.; or c) the potential need for reapplication, etc. in the face of rising average temperatures and increased agricultural/residential nutrient runoff, the approval of this application would be, at best, irresponsible. Given the potentially massive adverse impact to the ecological and financial well being of the community and the region as a whole, we ask again that you deny the application at this time.

Thank you for your time and consideration.

Travis and Kate Ryan
Skaneateles Resident

Sent from my iPhone

From: James Richardson
To: dec.sm.Comment.Skaneateles2021
Subject: Please note the following facts:
Date: Tuesday, March 1, 2022 5:50:02 PM

Please note the following facts:

1. Any comment by a representative of the company providing the algicide is completely irrelevant, obviously they will promote their product.
2. Removal of the primary cause of HAB has not been sufficiently addressed including making lawn fertilizer illegal in the Skaneateles Lake watershed. Posting signage encouraging NO urinating in the lake while boating. Most reservoirs supplying drinking water to a population post regulations regarding washing and fouling the water. Distributing reusable portolets convenient for boaters to offload at the end of their boating session and/or making more toilets, portable or permanent, readily available to boaters to accommodate. The Hetch Hetchy reservoir in CA is a good example of this. The "Cove" at the north end of the lake has up to 50 boats anchored all using the shallow waters near the offending areas of HAB's and water intakes for Syr city water as their toilet on any given summer day. Farms need to be limited in their use of fertilizers, number of livestock or at least some regulation.
3. Treating the drawn Syracuse water supply with precipitating chemicals and filters so the drinking water is safe regardless of the contaminants within.
4. Educating the public regarding the importance of maintaining and how to maintain a clean lake should be paramount.
5. Maintaining the level of the lake high enough so shallow and resulting warmer water will deter the HAB formation. Teach conservation throughout the region during times of drought.
6. The easy way out is what you are proposing and only kicks the can down the road allowing for more and more additional applications. All other reservoirs supplying public drinking water have strict regulations and posted signs making it illegal to pollute in any way and it is unconscionable to consider anything but getting serious about this lake. Adding this potential carcinogen WILL affect generations of natural plant and animal life eternally. DO NOT permit this or any other application.

From:	Elizabeth K. Dreyfuss
To:	dec.sm.Comment.Skaneateles2021
Subject:	Fw: No to EarthTec in Skaneateles
Date:	Wednesday, March 2, 2022 5:14:19 PM

----- Forwarded Message -----
From: Elizabeth K. Dreyfuss <eakeady@yahoo.com>
To: comment.skaneateles2021@dec.my.gov <comment.skaneateles2021@dec.my.gov>
Sent: Wednesday, March 2, 2022, 05:09:40 PM EST
Subject: No to EarthTec in Skaneateles

This poisons the drinking water and makes it unsafe for us to swim in - please don't do it. Elizabeth Dreyfuss Skaneateles

From: Doyle, A. Patrick
To: dec.sm.Comment.Skaneateles2021
Cc: apd7520@gmail.com; Betsy
Subject: Comment Letter—Skaneateles Lake/City of Syracuse
Date: Wednesday, March 2, 2022 11:39:38 AM

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Ms. Karyn Hansen
NYS DEC— Division of Environmental Permits
625 Broadway, 4th Floor
Albany, NY 12233- 1750

Dear Ms. Hansen,

We are property owners at Pine Bluff on Skaneateles Lake. We understand that the NYS DEC is considering the application from the City of Syracuse for a permit to use Earth Tec (Active Ingredient: Copper Sulfate 19.8%) as a Harmful Algal Bloom treatment option on Skaneateles Lake by the City of Syracuse or affiliates or related parties thereof.

We have reviewed the letter dated February 27, 2022 from the Skaneateles Lake Association (SLA) to the NYS DEC. We associate ourselves with the position of the SLA stated in their letter and urge the NYS DEC to accept and follow the Summary of Statements, Requests, and Recommendations set forth in the SLA's letter.

Very truly yours,
A. Patrick Doyle
Elizabeth Downes
2053 Pine Bluff
Skaneateles, NY 13152

From: CNY COMPOST
To: dec.sm.Comment.Skaneateles2021
Subject: SPDES Permit Application for Skaneateles Lake
Date: Wednesday, March 2, 2022 10:29:51 AM

To whom it may concern,

As residents of the town of Skaneateles, we strongly urge the New York State Department of Environmental Conservation to deny or indefinitely postpone consideration of the City of Syracuse's permit application for use of the algicide EarthTec in Skaneateles Lake.

Among the many compelling reasons for denial of this application (including insufficient data on immediate aquatic-life impact, indeterminate preexisting levels of elemental copper in Skaneateles Lake sediment, and the lack of a post-application monitoring plan), we are most concerned about the startling lack of literature or case studies demonstrating the overall efficacy and—more importantly—long-term environmental impacts of copper sulfate pentahydrate and metallic copper treatment on similar lake ecosystems.

Given that no satisfactory data or case studies have been provided covering a) the long-term effects on humans or pets exposed through ingestion of lake water, swimming and recreational activities, etc.; b) long-term effects on aquatic life, lake oxygen levels, etc.; or c) the potential need for reapplication, etc. in the face of rising average temperatures and increased agricultural/residential nutrient runoff, the approval of this application would be, at best, irresponsible. Given the potentially massive adverse impact to the ecological and financial well being of the community and the region as a whole, we ask again that you deny the application at this time.

Thank you for your time and consideration.

There are more effective (yes more expensive) ways to treat this issue, but for the tax prices we pay, we should have a say as to how our own watershed is treated.

--
Thank you,
CNY Compost

From: Michael Bongiovanni
To: dec.sm.Comment.Skaneateles2021
Subject: Skan Lake Draft Permit Application for EarthTec (Active ingredient: Copper Sulfate 19.8%)
Date: Wednesday, March 2, 2022 2:03:15 PM

To whom it may concern,

As a town of Skaneateles resident, I have read about the current proposed permit application to use a copper sulfate material in the lake s north end in hopes of possibly helping to treat algae blooms. I am not in favor of using this addition of a permanent toxin, the copper sulfate, to treat temporary condition. It seems that more in depth studies would be/should be required to determine the long term effects on our lake before this action is permitted. And Skaneateles lake should not be the research guinea pig.

Michael Bongiovanni
2073 Pine Blf
Skaneateles, NY 13152

315-436-7431 cell
315-475-9937 x213
No Landline

From: Amy Allyn
To: dec.sm.Comment.Skaneateles2021
Subject: Copper Sulfate treatment
Date: Wednesday, March 2, 2022 4:03:56 PM

To whom it may concern,
I am a lake front property owner in the village of Skaneateles @ 14 West Lake Street. My husband and I have 4 children and 2 dogs and we all swim in the lake and the guys enjoy fishing.
I think we are putting another problem (a chemical that kills fish and plants) and will keep us out of the water to solve another problem (blue green algae). I think at the very least this is being rushed through.
I may be reached at this email for any questions,
Amy Allyn

Sent from my iPhone

From: Julie Abbott
To: dec.sm.Comment.Skaneateles2021
Subject: Extend Comment deadline
Date: Wednesday, March 2, 2022 11:47:37 AM

Hello, Karen!

Given the technological difficulty citizens, including me, had connecting via last night's hearing, I'm respectfully asking that you consider extending the deadline for people to comment on the Permit Application. Thanks for your consideration!

Best,

Julie Abbott
Onondaga County Legislator, District 6

From: Susan W.
To: dec.sm.Comment.Skaneateles2021
Subject: Opposition to algicide EarthTec to be used on Skaneateles Lake
Date: Tuesday, March 1, 2022 3:31:30 PM

To the DEC: Please do not allow the use of this algicide in our lake!

I am a resident of Skaneateles and currently draw my water from the lake. I am VERY STRONGLY opposed to the use of the algicide EarthTec on Skaneateles Lake. There is NO evidence of this product being used in a similar circumstance. Using it now on Skaneateles Lake would be experimental, and there are many concerns that it wouldn't even work! PLUS, there is evidence that copper levels are already high in the lake, and adding this algicide will damage aquatic life.

I hope you take into account the views of the huge number of concerned citizens AND the opinions of the many scientists at the Skaneateles Lake Association and NOT use this algicide on our lake!

Regards,
Susan Wulff
2746 East Lake Rd
Skaneateles NY 13152

From: Jennifer Troisi
To: dec.sm.Comment.Skaneateles2021
Subject: Opposition to algicide
Date: Tuesday, March 1, 2022 4:33:15 PM

As a long time lover and part-time resident of Skaneateles, I am wholeheartedly opposed to the application of the algicide to stem the HABs. While I know it is a complicated issue, the answer is surely not to pollute our beautiful lake even more. We need to be focused on controlling our watershed and banning pesticides, phosphorus, and nitrogen products within it. The answer is not to add any more chemicals to the lake (I would like to keep eating the fish without worry). The answer is holding landowners (think of all the expansive lawns with no buffer) businesses (like the country club with its golf course right by the lake), and farmers (there are better farming techniques that can be implemented) accountable for the destruction and pollution of the lake. Adding chemicals that are not even fully proven to work or tested properly should never be the answer, especially when there is already too much copper content in the water. I have watched this pristine lake slowly become less so as it continues to become more eutrophic every year. Please do not do any more harm to this lake that I love and cherish and would like for my descendants to do the same. Thank you for your time.

Sincerely,
Jennifer Troisi

Sent from my iPad

From: Seth Thibault
To: dec.sm.Comment.Skaneateles2021
Subject: SPDES Permit Application - Skaneateles
Date: Tuesday, March 1, 2022 9:18:29 PM

Dear Sir or Madame,

As residents of the town of Skaneateles, we strongly urge the New York State Department of Environmental Conservation to deny consideration of the City of Syracuse's permit application for use of the algicide EarthTec in Skaneateles Lake.

It appears to me there is a significant lack of literature demonstrating the overall efficacy and—more importantly—long-term environmental impacts of copper sulfate pentahydrate and metallic copper treatment on similar lake ecosystems. Please provide any examples I haven't been able to uncover on my own that demonstrate how this this is a safe procedure with no risk to the lake and surrounding residents.

I think we're all familiar with the history of Onondaga lake and before decisions are made I'm hoping research or relevant case studies can be uncovered before taking action on skaneates lake. Given the potentially massive adverse impact to the ecologicall well being of the community and the region as a whole, we ask that you deny the application at this time.

I look forward to hearing back from you.

Seth & Lynn Thibault

Seth Thibault
347 349 0449

From: Barbara Gaffney
To: dec.sm.Comment.Skaneateles2021
Subject: EarthTec- Skaneateles Lake
Date: Wednesday, March 2, 2022 1:31:22 PM

To Whom it May Concern,

As a citizen of Skaneateles, I am concerned regarding the NYDEC's consideration of using EarthTec in Skaneateles Lake. EarthTec is toxic to fish, can cause irreversible eye damage, and use of the product may be a violation of Federal law if it causes death in endangered species or adverse modification of their habitat. I stand with the Skaneateles Lake Association in their opposition to allowing EarthTec to be used in Skaneateles Lake.

Regards,
Barbara Kelly

From: Katie Peck
To: dec.sm.Comment.Skaneateles2021
Subject: Fwd: Skaneateles Lake: Algicide
Date: Wednesday, March 2, 2022 4:21:50 PM

Dear Karyn,

I am a resident of Skaneateles and have enjoyed the lake my whole life. As I've lived in other countries and states, I've always described my home as an idyllic village by a lake with water so clear that you can see as far as the light will travel. I've seen the lake change over my lifetime with the arrival of zebra mussels and milfoil, and most recently, with blue-green algae. These changes were caused by human actions.

To protect our lake and our water source we need to advocate for lasting changes to farming and lifestyles, we need our community to commit to lawn care, road care, and farming practices that protect our lake. We do not need to add harmful chemicals that will hurt aquatic life and deposit copper in our lake. This is not a solution but a bandaid that will lead to further destruction of our beautiful lake.

I urge the NYSDEC to reject the use of EarthTec in Skaneateles Lake.

Regards,
Katie Peck

From: Melissa Pavlus
To: dec.sm.Comment.Skaneateles2021
Subject: Skaneateles Lake and EarthTec permit
Date: Wednesday, March 2, 2022 2:46:50 PM

Hello,
I would like to voice my strong opposition in granting the City of Syracuse's permit to apply the product EarthTec. I appreciate and understand the threat of HABs as a continued concern and serious. However, I have deep concerns regarding the safety and efficacy of using EarthTec to combat HABs. One of my biggest concerns is applying this copper based product to an unfiltered drinking water source and a body of water that is used for recreation as extensively as Skaneateles Lake. If this product clearly and repeatedly states on its label, that it is toxic to fish and aquatic invertebrates, how can it be safe for people to drink and swim in?
We must do everything we can to protect this precious water source for so many people.
Please deny the permit application to use EarthTec algicide in Skaneateles Lake.

Thank you for the opportunity to voice my concerns.

Melissa Pavlus
3325 Kane Ave
Skaneateles, NY 13152

Sent from my iPhone

From: Frank Moses
To: dec.sm.Comment.Skaneateles2021
Subject: City of Syracuse SPDES Permit - Public Participation Concerns - Extend Comment Deadline
Date: Wednesday, March 2, 2022 1:48:46 PM

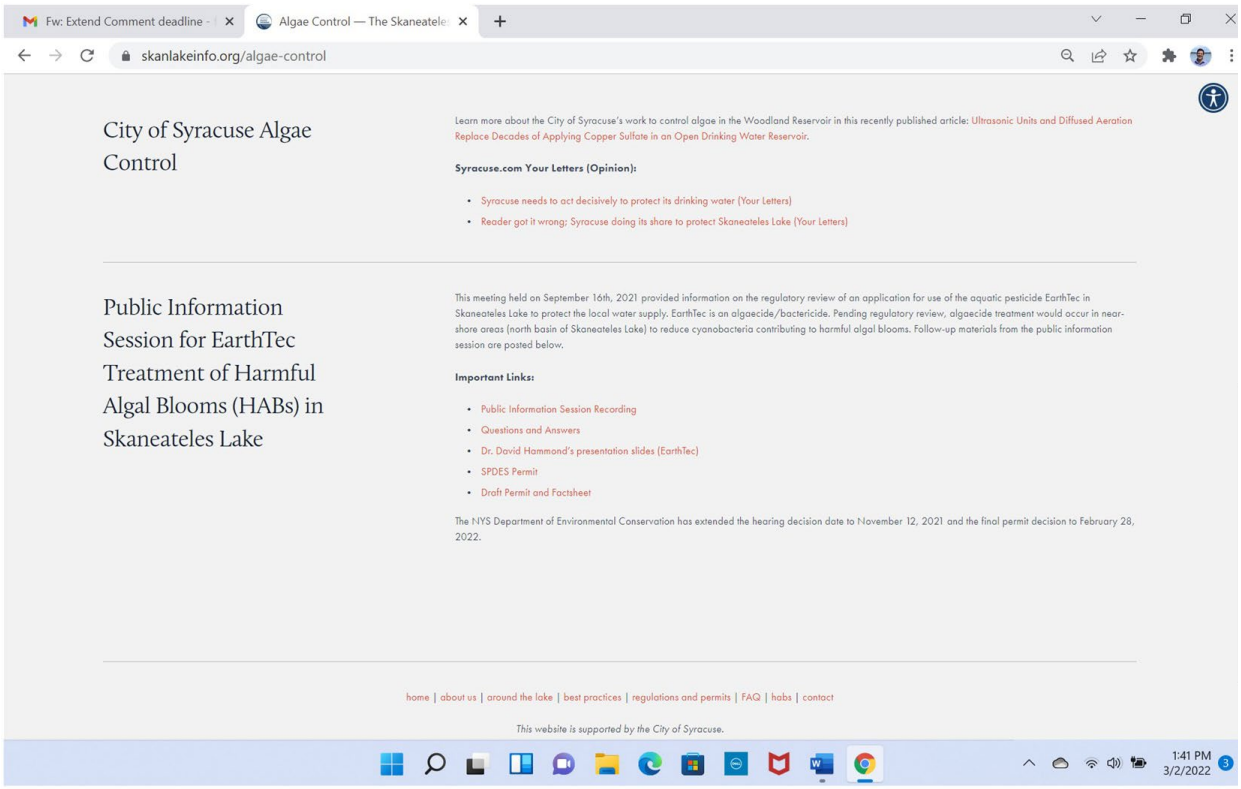
Dear Ms. Hanson and DEC Permitting Team-

Thank you again for your service in facilitating the virtual public hearing last night. It is understandable that at the time of setting the public hearing date that there were heightened concerns re: COVID -19 and keeping our community safe while providing a public participation opportunity. We are pleased that the DEC made the decision to see that a public information meeting and public hearing was held.

Please see below a list of concerns in regards to optimizing public participation that is of great concern to the Skaneateles Lake Association re: stakeholder transparency and engagement. It is because of these concerns that the **Skaneateles Lake Association requests an extension of the written public comment period and that a decision is made as soon as possible so that the community can be updated properly.**

Public Participation concerns regarding City of Syracuse SPDES permit process:

1. As part of the initial Environmental News Bulletin on Jan 26, 2022 and **at time when the Public Notice regarding the hearing was listed** via Syracuse.com and the Press Observer, **was all the pertinent registration information in place?** It is our impression that webex registration instructions and the deadline to register to speak by 10 am on Feb. 28th was not established until sometime after the initial public notice was announced and possibly occurred less than 30 days from the Public Hearing date.
2. The **instructions for the registration process while comprehensive was onerous for the public** to engage with too many steps to follow that could have been reduced. Removing barriers to public engagement should always be at the forefront to facilitate a more meaningful democratic process.
3. There were individuals who:
    - **registered but never received the link** possibly due to company email filters.
    - registered and received the link to attend and then **could not access via the webex platform**.
    - called in and were **unsuccessful at obtaining an opportunity to speak**
    - on the webex had **trouble navigating the ability to raise their hand**
4. **30 days seems insufficient i**n advance of the hearing **without all the details in place** and **should be extended** based on the interest of this issue.
5. While not a requirement by DEC re: public notice, there is much disquietude in regards to **very few communication outlets providing pertinent information** beyond a post in the ENB, Syracuse.com, and efforts from the SLA and associated lake advocates.
6. Information or pertinent links were not found on the City of Syracuse Water Department's website nor via the Skaneateles Lake Municipal Watershed Partnership (The SWMP). The SWMP notes that the "website is an effort of the Skaneateles Watershed Municipal Partnership (SWMP), which is an initiative of the local watershed municipalities and organizational partners. Our goal is to work collectively to bring you the most up to date information regarding the Skaneateles Watershed and to work together to promote a healthy future for our beautiful water source." A**s of 1:30 PM on March 2, 2022 the website https://www.skanlakeinfo.org/algae-control still states the following: "The NYS Department of Environmental Conservation has extended the hearing decision date to November 12, 2021 and the final permit decision to February 28, 2022...This website is supported by the City of Syracuse."**



Thank you for considering this reasoning and a subsequent decision to extend the written comment deadline.

Thank you!

Sincerely,

Frank

Frank Moses

Executive Director

Skaneateles Lake Association

frank.moses.sla@gmail.com

www.skaneateleslake.org

From: David Miller
To: dec.sm.Comment.Skaneateles2021
Subject: City of Syracuse SPDES Permit Application
Date: Wednesday, March 2, 2022 3:29:45 PM

As a member of the SLA,I am opposed to granting this permit for the following reasons:

1. The EarthTec pesticide is toxic to fish and aquatic life.
2. The copper element in EarthTec will add to the already high levels of copper sulfates in Skaneateles Lake sediment.
3. Algae and other organisms killed by the EarthTec pesticide will settle on the bottom and decompose, adding to the nutrient load in the Lake water.
4. Is the risk/reward analysis equation worth the cost and potential environmental damage? Are we trading the potential of an HAB event contaminating the drinking water intake for a certain contamination of the Lake ecosystem?
5. The City of Syracuse needs to reduce its waste of nearly half of the 40 million gallons of water taken from the Lake due to its leaky infrastructure. A reduction of water taken could reduce the possible HAB contamination.
6. The City of Syracuse needs to step-up its role in watershed management. The nutrient load from residential septic systems has increased as a consequence of the City's lack of monitoring such systems.

Thank you for the opportunity for public comment.

David V. Miller
13 Hannum St.
Skaneateles, NY 13152

From: Brian Madigan
To: dec.sm.Comment.Skaneateles2021
Cc: 4lcskan@gmail.com
Subject: DEC Application ID Nos. Article 17 Titles 7 & 8 Industrial SPDES - Surface Discharge - (7-3150-00112/00004)
Date: Wednesday, March 2, 2022 8:34:17 AM

I would like to add my comments with respect to the above referenced application proposal as I was unable to attend the public hearing last evening (3.1.2022). It is my understanding that the City of Syracuse is applying for a SPDES permit that would authorize the City of Syracuse to treat Skaneateles Lake with the algicide, EarthTec, to decrease the density of microcystin-producing cyanobacteria that contribute to harmful algal blooms near the City's drinking water intakes. My family and neighbors are concerned about the potential health effects of this product. Therefore I would like to submit the following comments for consideration prior to advancing this application.

1. It is important to ensure that this substance is thoroughly studied for potential health effects, not only with respect to the public water supply but with respect to private water intakes surrounding the lake.
2. Consideration must be given to the long term effects of the product if it is to be used over an extended period of time (for humans, as well as, the overall biological health of the lake).
3. In the event that health effects can be linked to EarthTEC following its use, the City of Syracuse should develop a plan of action for remediation of the product, as well as, policy for indemnification of residents who are affected by its use.
4. The City and County should also address a means of reducing property taxes paid by lakefront residents as the use of this product is more than likely to affect the perception of current and future homeowners in the area.
5. Use of the product should be highly publicized and fully disclosed so that the large number of people who are seeking to live in the area are fully aware of the use of the product.
6. Safety Data Sheets should be distributed to all property owners and home buyers within the watershed. I do not believe that in this situation, property owners should be responsible for obtaining information regarding this product on their own.

I hope this information is useful as there are many in the community who are striving to maintain and improve the water quality of Skaneateles Lake for future generations.

Thank you for your time and consideration.
--
Best regards,

Brian

"Innovation by Design"

From: Katelyn MacDougall
To: dec.sm.Comment.Skaneateles2021
Subject: against use of algicide
Date: Wednesday, March 2, 2022 2:12:37 PM

We are Skaneateles Village residents and are against the use of the algicide EarthTec in Skaneateles Lake. We are worried about the warning labels this product carries and do not feel safe for our lake, a source of drinking water for so many.

We appreciate your attention to this matter.

Thank you,
Katelyn & Luke MacDougall
38 East St, Skaneateles, NY 13152

From:	Jeff LaMarca
To:	dec.sm.Comment.Skaneateles2021
Subject:	Comment on Syracuse Permit for Algicide on Skaneateles Lake - Application #7-3150-00112/00004
Date:	Wednesday, March 2, 2022 4:48:46 PM

Dear Ms. Hanson:

I am writing to urge the NYSDEC to deny the City of Syracuse's application for a permit to dump toxic pesticide into Skaneateles Lake.

Toxic algae blooms are occurring on Skaneateles Lake because it is already polluted. It is polluted with agricultural runoff (despite being deemed a "protected" watershed), erosion runoff as a result of deforestation and overdevelopment (again, despite being "protected"), and invasive aquatic species like milfoil which are brought to the lake via public boat launches. The water temperature of the lake has risen in recent years because of greenhouse gas pollution that causes global warming. And power boats of any size are allowed to travel at any speed, anywhere on the lake, stirring up sediment and loading the water column with nutrients.

All of the above factors combine to create conditions which allow cyanobacteria to grow in Skaneateles Lake. And the City of Syracuse and/or the DEC have both the authority and responsibility to address all of these causes of toxic algae blooms.

It's baffling that the City of Syracuse wants to proceed straight to spiking the lake with a toxic, nonbiodegradable metal when it has not even tried the simple measure of establishing a speed limit on the lake, given that we know cyanobacteria thrive in nutrient-rich water and that Skaneateles Lake's sediment is extremely rich in nutrients relative to its water. (Onondaga County did declare a 5mph speed limit last year, but it was not publicized, not enforced, and lasted only a few days.) In addition to limits on boat speed and size, Syracuse could impose stricter limits on the use of soil amendments and manure by farms in the lake's watershed. It could work to curb forest clearing in the watershed and giant residential construction projects on the lake. The DEC could make bilge cleaning mandatory at its boat launches (or shut down the boat launches altogether). It's possible that one or a combination of these measures could significantly reduce or even eliminate HABs on the lake, but they have not been attempted.

We should be doing everything we possibly can to protect and preserve irreplaceable natural resources like Skaneateles Lake, rather than allowing them to become polluted and then responding to the consequences of our poor stewardship with even more pollution.

Sincerely,
Jeff LaMarca
Skaneateles, NY

From: Sherill Ketchum
To: dec.sm.Comment.Skaneateles2021
Subject: EarthTec Algicide in Skaneateles Lake
Date: Wednesday, March 2, 2022 11:37:55 AM

Attn. Ms. Karen Hanson, Environmental Analyst

Dear Ms. Hanson,

I have grave concern over the plan to use the algicide EarthTec on algal blooms in Skaneateles Lake

Given the water filtration avoidance waiver currently in effect, Skaneateles lake cannot be the Guinea pig in an experimental program that has yet to be proven effective on such a body of water without harm to human or aquatic life. Adding metals (in this case copper), to the lake, which already exist at high levels seems reckless.

I serve on the Town of Skaneateles Zoning Board, and spend a good deal of my time making sure that projects brought before the Board have taken into consideration the quality of the water that serves so many residents of Skaneateles, Syracuse and surrounding communities.

Until there is concrete evidence that it will be effective without harm to the environment, I wholeheartedly oppose it.

Thank you for your consideration.

Sherill Ketchum
2793 Rickard Road
Skaneateles, NY

From: Mary Morrissey
To: dec.sm.Comment.Skaneateles2021
Subject: Opposition to SPDES permit for algicide, EarthTec
Date: Wednesday, March 2, 2022 1:58:56 PM

Hello,

My name is Mary Morrissey Kerwick and I am a Skaneateles native currently residing at 105 East Lake Road, Skaneateles, NY 13152. I oppose the SPDES permit to use the Algicide EarthTec at this time. I believe we need more time to educate the community about risk factors and long term effects to our aquatic life.

If anything, we need to ban the use of those lawn care products and fertilizers that all of the huge year round homes use now. It's unnecessary and harmful to our lake.

Thank you for your consideration,

Mary

--
Mary Morrissey Kerwick

From:	Alan Johnson
To:	dec.sm.Comment.Skaneateles2021
Subject:	algigide
Date:	Wednesday, March 2, 2022 4:20:11 PM

I am writing to urge DEC to not use the algicide EarthTek on Skaneateles Lake.
The onerous saftey precautions indicate that this product is far to dangerous to use on Skaneateles Lake.
This copper product is toxic to fish and will settle out and accumulate with multiple treatments.

Alan Johnson, Skaneateles

From: Sidnie HOWARD
To: dec.sm.Comment.Skaneateles2021
Subject: EarthTec Use Skaneateles Lake
Date: Wednesday, March 2, 2022 10:53:55 AM

Dear Karyn Hanson,

Please receive this email as plea as I stand with the Skaneateles Lake Association, we ask that EarthTec not be used in Skaneateles Lake. The harmful blooms are an imminent threat and something must be done, but the risks of Earthtec cannot be part of the desperately needed solution.

Thank you,

Sidnie D'Amelio, Skaneateles Resident

From: Claire Howard
To: dec.sm.Comment.Skaneateles2021
Subject: Algicide on Skaneateles Lake
Date: Wednesday, March 2, 2022 1:34:39 PM

To: City of Syracuse and the DEC:
I attended last evening's public comment webinex program on the question of permitting Syracuse to apply copper sulfate to Skaneateles Lake.
I agree with the comments made concerning the need for further study. The levels of copper in the lake sediment need to be established, and negative consequences of increasing copper in the aquatic environment studied further. Just because copper sulfate was applied "successfully" for 50 years here does not justify further use of this pesticide. In my opinion much more preventative measures to control farm and road runoff, stricter control of development around the lake, and increased monitoring of existing septic systems in the watershed need to be taken. The increased housing around Skaneateles Lake over the past 50 years is astounding. Applying copper sulfate seems to me to be an experimental stopgap "solution" rather than a well researched, wise path forward.
Thank you,

Claire Howard
Town Councilor 2014-2018
12 Academy St
Skaneateles
Town resident since 1968

Sent from my iPhone

From: Nancy Peck
To: dec.sm.Comment.Skaneateles2021
Subject: Vote Against Using EarthTec in Skaneateles Lake
Date: Wednesday, March 2, 2022 10:45:52 AM

I am a lakefront property owner on Skaneateles and would like to register my voice as a VOTE AGAINST using EarthTec for the following reasons:

Copper Sulfate doesn't biodegrade and becomes Hazardous Waste.

There are no guaranteed clean-up commitments and it can be extremely expensive.

Copper Sulfate is toxic to humans.

Copper Sulfate doesn't treat the causes of algae.

Copper Sulfate in detrimental to all aquatic life and plants.

These are just some serious concerns about the use of EarthTec. It is highly corrosive and doesn't necessarily end algae blooms and it can actually contribute to rebound blooms. There are other solutions that don't involve Copper Sulfate and this would possibly be a way that would be much better in a lake that is a source of drinking water and recreation.
Please - - DO NOT USE EARTH-TEC IN SKANEATELES.

Thank you,
Nancy Peck
2515 East Lake Road
Skaneateles, NY 13152

From: dec.sm.DEPPermitting
To: dec.sm.Comment.Skaneateles2021
Subject: FW: NO chemicals in Skaneateles Lake
Date: Thursday, March 3, 2022 5:05:37 PM

FYI

From: Molly Phillips <mollyphillips2@gmail.com>
Sent: Wednesday, March 02, 2022 6:29 PM
To: dec.sm.DEPPermitting <DEPPermitting@dec.ny.gov>
Subject: NO chemicals in Skaneateles Lake

Dear Karyn Hanson,

I am writing to say we are firmly against the use of the chemical Earthtec in Skaneateles Lake. It is completely irresponsible to use this in our drinking water when the warnings from the company even list the following:
EarthTec is:
1) Toxic to fish
2) Can cause irreversible eye damage
3)Use of this product may be in violation of Federal law if it causes death in endangered species or adverse modification of their habitat.
(These are just a few lines from box warning on label)

In a time when we are seeing how vulnerable the earth and our waters are, we would expect that you will do what is healthiest for all of us.

Thank you,
Molly and Todd Phillips
Skaneateles, NY

Contact:
Ms. Karyn Hanson
NYS Department of Environmental Conservation
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, New York 12233-1750
Phone: (518) 402-9167
Email: deppermitting@dec.ny.gov

From: Oleg Shapiro
To: dec.sm.Comment.Skaneateles2021
Subject: SLA position
Date: Wednesday, March 2, 2022 12:45:26 PM

Dear All,
My wife Anna and I, oppose placing copper sulfate into the lake due to long term effects of the chemical. We stand with the SLA on this issue
Thank you for your consideration

Oleg Shapiro, MD FACS
Professor
Departments of Urology and Radiation Oncology
Vice-Chairman, Clinical Operations
Department of Urology
Upstate Medical University

Tel: 315 464-6113
Fax: 315 464-6117

From: C
To: dec.sm.Comment.Skaneateles2021
Subject: Syracuse Citizen Comment
Date: Wednesday, March 2, 2022 11:00:53 AM

re: Permit(s) Applied for (Application Number):

Article 17 Titles 7 & 8 Industrial SPDES - Surface Discharge - 7-3150-00112/00004

As a Syracuse city resident who relies on Skaneateles water quality for potable water I oppose the application of copper sulfate at this time. The science presented at the public hearing clearly indicates that the risks to the watershed are real. My second concern is the poor track record of notifying residents of 'water events' until many weeks after these events. For example, after wind/rain events my water tap may show cloudy water or sediment in the toilet bowl, followed by a high chlorine odor for several days; two months later I am notified. Following this type of protocol would be a potential disaster with cyanobacteria. At last night's hearing, I did not hear the voices of city residents. No one that I know is aware of this issue though they know about algae blooms. I happen to belong to SLA as I was born and raised in Skaneateles and see this organization as able to be proactive in protecting the waters. Cyanobacteria is a real threat but the application of copper sulfate products has the potential for much worse consequences.

Thank you

Carolyn Stafford

135 Brooklea Place

Syracuse NY 13207 3154305675

From: T Square Designs
To: dec.sm.Comment.Skaneateles2021
Subject: Skaneateles Lake Copper Sulfate Treatment Proposal
Date: Wednesday, March 2, 2022 12:38:05 PM

As concerned residents (since 1967) our family strongly opposes any use of EarthTec's copper sulfate treatments on the Lake until all SLA's concerns and requests for further testing has been done assuring all inhabitants of the Lake will not be harmed by said treatments. It is critical we take all precautions in preserving the purity of our water systems now and for future use. Please tread carefully and respectfully during this consideration processes.

Thank you for respecting the voices of those whom will be most affected by this decision.

Respectfully,

Megan Quinn Trombley
2011 Pine Bluff Road
Skaneateles, NY 13152

Sent from my iPhone

From: Audrey Van Voolen
To: dec.sm.Comment.Skaneateles2021
Subject: Skaneateles Lake "EarthTec" copper sulfate pentahydrate application comment
Date: Wednesday, March 2, 2022 9:20:10 PM

Karyn Hanson
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233
Via email

Dear Ms. Hanson:

I am a resident of the village of Skaneateles and I strongly oppose the use of "EarthTec" in Skaneateles Lake.

HABs are a symptom of a lake and a watershed that have not been properly cared for. Skaneateles Lake used to have much clearer water and did not support algae growth. Over the years, the City of Syracuse has failed to adequately protect the lake from runoff, overuse, and overdevelopment, leading to murkier water and outbreaks of algae slicks during warm, calm days. These HABs are a health hazard to those who drink from and swim in our lake, but the last thing we need is to create another health hazard by pouring pesticide into the water (especially when this pesticide will accumulate in the lake bottom and stay there forever). The City of Syracuse and the DEC should be treating the underlying causes of HABs, which are known and addressable.

The NYSDEC should reject the city's permit request.

Thank you,
Audrey Van Voolen

Audrey H. Van Voolen, PhD
Licensed Clinical Psychologist | Director
Skaneateles Psychology Associates
3460 County Line Rd
Skaneateles, NY 13152
(315) 217-6888 ext. 21
dravv@skanpsych.com| http://www.skanpsych.com

to immediately notify the sender and to delete the message from your system.

This communication contains protected health information and has been disclosed to you from records protected by Federal (HIPAA) and New York State privacy and confidentiality laws and regulations. This is strictly confidential material and is for the information of only the person or entity to which it is addressed. No responsibility can be accepted if it is made available to any other person or entity. Federal and New York State laws and regulations prohibit you from making any further disclosure of this information unless further disclosure is expressly permitted by the written authorization of the person to whom it pertains, or is otherwise permitted by law. Re-disclosure in violation of applicable laws and regulations may result in a fine or jail sentence or both. In certain instances, a general authorization for the release of health information is not sufficient authorization for further disclosure.

Despite my intentions even email sent to the correct address may be accessible to unauthorized persons because the "servers" through which email is routed are not securely protected. Thus the privacy and confidentiality of email communications cannot be assured. Vulnerability may be lessened when email is encrypted. This email is encrypted. Please notify me in writing if you wish me not to send you any further emails; you may send me such notification by replying to this email. If I do not hear from you, I will continue to communicate with you by email.

Do not use email to communicate with me if a healthcare emergency arises. I do not check emails frequently enough for it to be used in such emergencies. Rather, contact me by telephone at the number above.

From:	dec.sm.language
To:	dec.sm.Comment.Skaneateles2021
Subject:	FW: Preserving SKANEATELES LAKE
Date:	Friday, March 4, 2022 3:13:10 PM
Attachments:	image001.png image002.png image003.png image004.png

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Hello,

We received this email to our language@dec.ny.gov inbox – we believe it was intended to go to you after the public hearing on Tuesday.

Thanks!

Best,

Emma Antolos
Pronouns: She/her/hers
Public Participation Specialist, Bureau of Public Outreach

New York State Department of Environmental Conservation
625 Broadway, Albany, NY 12233
P: (518) 402-9432 | F: (518) 402-9036 | emma.antolos@dec.ny.gov
www.dec.ny.gov | | | |

NEW YORK STATE | Department of Environmental Conservation

From: Phil Hider <pahider@yahoo.com>
Sent: Monday, February 28, 2022 7:55 AM
To: dec.sm.language <language@dec.ny.gov>
Subject: Preserving SKANEATELES LAKE

We have been thankful users of Skaneateles Lake since 1963.

Please don't make it a test site by infesting it with chemicals not proved on a body of water the size of our lake.

Phil Hider

From: Kathleen Morrissey
To: dec.sm.Comment.Skaneateles2021
Subject: Fwd: Public Comment - Re:City of Syracuse Permit Application for use of EarthTec
Date: Friday, March 4, 2022 10:08:46 AM

Please see time and date stamp below. There was one minor error in the email address I used. Please consider accepting this public comment
Sent from my iPhone

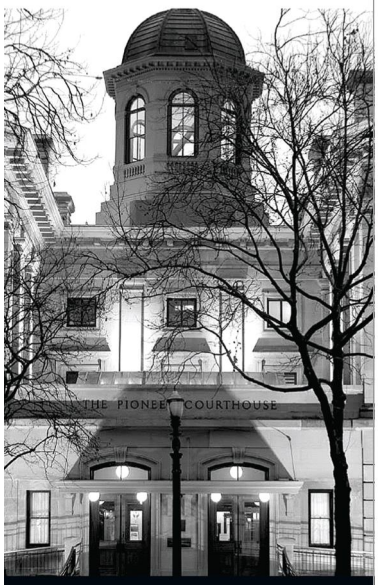
Begin forwarded message:

From: Kathleen Morrissey <kcmorrissey@me.com>
Date: March 2, 2022 at 4:11:19 PM EST
To: comment.skaneateles2021@dec.ny.giv
Subject: Public Comment - Re:City of Syracuse Permit Application for use of EarthTec

Hello,

At this time I oppose the NYSED's approval of the City of Syracuse SPDES DISCHARGE PERMIT for the use of the EarthTec Product. There are too many general uncertainties and unanswered questions about the use and efficacy of EarthTec in our large, deep, unfiltered body of water that provides municipal drinking water to many. Is the potential risk worth taking at this time? I think not. This would be a very hasty decision made without the public being well informed. Please halt granting the City of Syracuse this permit.

Regards,
Kathleen Morrissey
Skaneateles, NY



NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC)

VIRTUAL PUBLIC COMMENT HEARING
BY VIDEOCONFERENCE

HELD ON
TUESDAY, MARCH 1, 2022
AT 2:59 P.M.

BEFORE
THE HONORABLE MOLLY MCBRIDE
ADMINISTRATIVE LAW JUDGE

SYRACUSE, NEW YORK

APPEARANCES BY VIDEOCONFERENCE

APPEARING FROM DEC

Maria Katchmar

Matthew Marko, Regional Director of DEC Region 7

Don Canestrari, Section Chief of DEC Bureau of Water Permits

MEMBERS OF THE PUBLIC

Richard Hole

Paul Torrisi

Julie Abbott

Frank Moses

Bob Honold

Louis Martin

Marybeth Carlberg

Jessica Millman

Mary Torrisi

Hamilton Fish

Victor Duniec

James Tifft

Virginia Calvert

Jack Riley

James Richardson

Kathleen Morrissey

APPEARANCES (CONTINUED)

Melissa Pavlus

VIRTUAL PUBLIC COMMENT HEARING

HELD ON

TUESDAY, MARCH 1, 2022

AT 2:59 P.M.

BEFORE

THE HONORABLE MOLLY MCBRIDE

ADMINISTRATIVE LAW JUDGE

JUDGE MCBRIDE: Good evening, everyone. My name is Molly McBride, and I'm an Administrative Law Judge with the New York State Department of Environmental Conservation.

I'll be presiding over this evening's public commentary, to accept comments on the application on the city of Syracuse addressed fees permit to apply the pesticide EarthTec in targeted areas of Skaneateles Lake. The DEC application number for this project is 7-3150-00112/0004.

On July 14th, 2021, the department issued a notice of complete application for this application. Notice of this hearing was published in the Skaneateles Press on January 26, 2022 and in the Post Standard on January 25th, 2022. Notice was also published in the DEC's Environmental Notice Bulletin on January 26th, 2022.

Assisting me today with this hearing from the DEC's Office of Communication Services is Maria Katchmar.

In a moment, I will introduce Matt Marko, who's the Regional Director from the DEC's Region 7 office, located in Syracuse and Don Canestrari, who's the DEC's Bureau of Water Permits' Section Chief, who will give you a brief overview of the application.

This public comments hearing is being held through the Webex electronic webcast platform. There are people who are attending this hearing over the internet, and there are some who are participating by telephone. In either case, you should have audio input from one device only. Otherwise, you may experience problems with feedback. Everyone has been muted upon their entry here this evening.

If at any time this evening you experience any technical issues, you may call the following phone number. It's area code (518) 402-8044. And again, that telephone number is area code (518) 402-8044.

The purpose of today's public comment hearing is to allow members of the public to comment

on the application of the City of Syracuse. This is not a question-and-answer session this evening.

Comments will be accepted at this hearing tonight, and written comments will be accepted until 5 p.m. tomorrow, March 2nd, 2022. Written comments must be emailed or postmarked by 5 p.m. tomorrow, March 2nd, 2022, to be considered by the department.

Equal weight is given to both written and oral comments. For those of you who are attending this hearing via the internet, we have the information on the slides that you will see on the screen that will tell you how to submit written comments.

Also, in a minute, I will read out the address to submit written comments for those of you who have joined us today by telephone.

Anyone who wishes to speak today was required to register. We will call registered speakers in the order in which they have registered, but first, I will call on elected officials who have registered to speak here this evening.

We will call your name when it is your turn to speak. At that time, your line will be unmuted if you have attended over the internet.

If you have attended by telephone, when we

call your name, we will ask you to please press star 3 on your telephone to raise your hand, so that we know what line you're on and we can unmute your telephone line. Please, do not press star 3 until we have called your name.

When you make your comment, please begin with your name and address. And if you are speaking on behalf of someone, on behalf of a group, please identify who it is you are representing.

When making your comment, please speak loudly, slowly, and clearly. All comments this evening are being recorded by a court stenographer. If we cannot hear you, there is a risk that your statement will not be recorded accurately.

We are not going to set a time limit tonight for comments this evening; however, when making your comments, please be mindful that there are others who are waiting to make their comments here this evening as well.

Before we begin the public comment, I'd like to introduce Matt Marko, who is the Regional Director in the department's Region 7 office, located in Syracuse.

Go ahead, Mr. Marko.

MR. MARKO: Thank you, Judge.

And good evening, everyone. As Judge McBride indicated, I'm Matthew Marko, Director of the DEC's Region 7, which encompasses a nine-county area and includes Skaneateles Lake, its watershed, and the City of Syracuse.

Thank you all for attending tonight's public comment hearing. DEC has numerous staff engaged in this project, both in the region and at DEC's headquarters in Albany.

We have been comprehensively reviewing public comments received to date during this extended comment period and are here tonight to actively listen to you.

I will now turn it over to Don Canestrari, Professional Engineer, and DEC's technical expert overseeing the technical review of the application and development of the draft permit.

He will give a brief overview of the matter pending before DEC. Don?

MR. CANESTRARI: Thank you, Matt.

Thank you everyone for attending tonight's hearing on this project.

As Regional Director Marko indicated, my name is Don Canestrari, and I am the DEC's State Pollutant Discharge Elimination System, or SPDES,

Bureau of Water Permit Section Chief, overseeing the technical review of the application and development of the draft SPDES permit.

In April 2019, the city began discussions with the DEC regarding the potential use of the pesticide EarthTec in targeted areas of Skaneateles Lake, to protect the public water supply from excessive algae growth and the development of harmful algal blooms, also known as HABs.

HABs have been detected in various locations in Skaneateles Lake, which is an unfiltered drinking water source for the City of Syracuse and surrounding communities. HABs are dense amounts of bacteria, similar to algae, that can produce toxins that can be harmful to people and animals.

Pesticides in New York state must be registered for use and sale by the U.S. EPA and DEC. All aquatic pesticides applications must be conducted by a New York state certified pesticide applicator.

The pesticide EarthTec, whose active ingredient is copper sulfate pentahydrate, has been registered and labeled for the control of algae and has been effectively applied to water bodies in

drinking water sources across the state.

Typically, aquatic pesticide applications in New York state are permitted under the SPDES pesticide general permit; however, DEC has required the city to apply for an individual SPDES permit to afford the public an opportunity to comment on the proposal, and, if permitted, allow DEC to impose additional permit conditions not contained in the general permit.

As described in the permit application and public notices, the proposal involves a treatment area along the shoreline of the north end of the lake. The treatment area would include a 750-foot-wide strip along the shore, extending a total distance of about 37,000 feet, which amounts to about a 670-acre treatment area.

Use of EarthTec would occur no more than twice per calendar year within the treatment area. DEC has developed a draft SPDES permit that includes conditions to ensure safeguards are employed and that the public has prior notification of the proposed pesticide treatment.

The following proposed conditions highlight some of the key protections built into the draft permit. Notification must be made to the

public 48 hours prior to the date of application.

In particular, the city of Syracuse must provide notification to the New York State Department of Health; the Onondaga County Health Department; DEC; Skaneateles Lake Association; elected officials of the village and town of Skaneateles; riparian owners and users within the treatment area; and if the treatment will occur within 100 feet of the Skaneateles Country Club bathing area, the village of Skaneateles bathing area, the village of Skaneateles pier, or the DEC boat launch, notification must be made to the beach or resource manager.

Post-application water quality monitoring will be conducted within 24 hours following treatment to verify pesticide byproduct concentrations, including the sign of bacterial toxin lake-resistant are at safe levels to resume routine water use and recreation.

And if the microcystin concentration is greater than or equal to four micrograms per liter after treatment -- and this is the New York state DOH guidance value, below which permitted bathing areas may reopen -- the city must notify local and state health emergent health departments within 24

hours.

The city will also notify the beach or resource manager within 24 hours for the purpose of coordinating postings as directed by the local or state health departments.

A notice of complete application and availability of addressed fees permit were first announced to the public on July 14th, 2021. The public comment period was extended from the original deadline of August 13th, 2021 and now runs through March 2nd, 2022.

Based on extensive public interest, DEC is also conducting a formal public comment hearing in accordance with New York State regulations. All verbal comments provided at this hearing and all written public comments submitted by the extended deadline will be thoroughly reviewed by DEC before making any final decisions on the department application.

Thank you for taking time to participate tonight.

JUDGE MCBRIDE: Thank you, Mr. Canestrari. I appreciate it.

Thank you, Mr. Marko, as well.

Before I begin calling the speakers, I

wanted to read off the mailing address for those of you who have joined us by phone tonight. I'll read this again at the end of the hearing, so if you don't have a pen and paper handy right now, I'll read it again if you've joined us by telephone. And if you join us over the internet, you will see the information on one of the slides that will come up.

The mailing address to submit written comments is Karyn Hanson, H-a-n-s-o-n, at the New York State DEC, Division of Environmental Permits. Again, that's Karyn Hanson at the DEC, Division of Environmental Permits. And the mailing address is 625 Broadway, Fourth Floor, Albany, 12233-1750. Again, Karyn Hanson, New York State DEC, Division of Environmental Permits, 625 Broadway, Fourth floor, Albany, New York 12233-1750.

If you would like to submit a comment by email -- and again, those emails and written comments will be due by tomorrow, postmarked by tomorrow if you're using the mail or emailed by 5 p.m. tomorrow -- the email address is comment, c-o-m-m-e-n-t, .skaneateles2021@dec.ny.gov. Again, that's comment.skaneateles2021@dec.ny.gov.

We're now going to begin calling our speakers. We will call your name when it is your

turn to speak, and at that time, your line will be unmuted. Again, if you have joined us by telephone and not by the internet, when you hear your name called, please press star 3 to raise your hand, so that we know which line to unmute.

And our first speaker this evening is Julie Abbott. Ms. Abbott, if you have joined us by telephone, please press star 3 on your phone to unmute -- to raise your hand so I know which line to unmute.

I do not see a raised hand, so I will call the next speaker, and we'll call Ms. Abbott again in a little while.

Our next speaker is Debra Hole, H-o-l-e.

RICHARD HOLE: This is her husband, Richard Hole. She's -- Debra's with me. Can you hear me?

JUDGE MCBRIDE: We can. Go right ahead.

RICHARD HOLE: Okay, fine. So I'm here on behalf of -- or as part of the Skaneateles Lake Association, and I actually would like to defer comments to -- I'm sure Paul Torrisi is on and Frank Moses, our Executive Director.

But I think the bottom line, from our perspective at the Skaneateles Lake Association, is

we feel that there hasn't been sufficient investigation done on the cost benefit of the use of the EarthTec product.

We're taking a -- treating a potential toxin, which is temporary, with another toxin, which is permanent. And we're treating an area of the lake along the north shore, 750-feet wide, well removed from the intake pipes of the city of Syracuse, and so we see deficiency in the benefit that might be derived from treating the lake in that area.

What benefit would the city receive when its intake pipes are well out into the lake? And we see deficiencies in the investigation that's been undertaken to analyze the potential impact of the use of this toxin in the lake and its impact on other aspects of the lake.

So we think it's premature to issue a permit at this time, that more work needs to be done to not only investigate the use of this toxin, but also note investigate alternatives. And I think that's basically, you know, the issues we have with what's being proposed here.

And I'm certain that our Executive Director Frank Moses and our President Paul Torrisi

can provide further information. Thank you.

JUDGE MCBRIDE: I'm going to call our next speaker, but just a bit of information. If you're on a different line, like Mr. Hole was on Mrs. Hole's line there, if you are attending by the internet under someone else's name and we call your name, you'll see that there's a small hand icon. We have that slide up now. You can raise your hand that way to let us know that we've called your name and we will unmute that line for you.

So if we do happen to call your name and you're signed on the internet under another name, just use that raised hand function to let us know which line you're on, and we'll unmute your line for you.

So our next speaker I don't see on our internet list, so I believe you may be in attendance by phone. It is Suzanne Guske-Klowski. If you're on the line, if you could raise your hand for us again by pressing star 3 on your telephone to let us know which line you're on, and we will unmute your phone line.

Suzanne Guske-Klowski, if you've joined us, please press star 3 on your phone. If you've joined us by the internet under another name that

we're not seeing on our list, please use the raised hand function.

I don't believe anyone has raised their hand, so I will go on to the next person and we will try again in a little while.

Our next speaker is Paul Torrisi.

PAUL TORRISI: Can everyone hear me?

JUDGE MCBRIDE: Yes, we can. Thank you. Go ahead.

PAUL TORRISI: Just an administrative point. When you gave the number of the -- the permit number, I believe there are four zeros before the 4 and not three. It's 00004, just for accuracy's sake, so the public knows that when they file their statements.

I want to -- I want to -- so my address is 2874 Westlake Road in Skaneateles, and I'm Board President of the Skaneateles Lake Association. I know our Executive Director Frank Moses will have a statement also, and I was assuming that he was going to precede me, but I will go ahead with mine.

I want to, again, personally thank the New York State DEC, Division of Environmental Permits, Karyn Hanson in Albany, and Matt Marko, Director of Region 7, for organizing this public hearing so

concerns can be addressed and folks can learn more about this request from the city of Syracuse.

Frank Moses, Executive Director of the SLA, will be addressing major concerns and eloquently expressing why the special committee of the Skaneateles Lake Association Board members, on behalf of the full Board of Directors of the SLA, has officially filed a statement of opposition to the use of EarthTec by the city of Syracuse as currently requested.

The signatories on the statement in addition to Frank Moses include the SLA -- include from the SLA Board Dr. Cornelius Neil Murphy, Dr. Charles Driscoll, Ms. Fran Fish, Dr. William Dean, Dr. Dana Hall, Dr. Buzz Roberts, Dr. James Tifft, myself, Dr. Paul Torrisi, attorney Rich Hole, whom you just heard from, and Mr. Joseph Grasso, a Dean at Cornell University.

To be clear, SLA's mission statement is to promote protection of the water quality of Skaneateles Lake and environmentally sound regional management of its watershed.

There has been a tremendous amount of time, energy, and expertise on the part of this special committee of the SLA board, by the way, all

of whom are volunteers, with the exception of its Executive Director.

In fact, they have been diverted from other productive work on the lake's behalf to investigate and research the use and efficacy of this product both elsewhere and as a potential useful algicide in a large, natural body of water such as Skaneateles Lake, which has over 430 billion gallons of water compared to the only 4 billion gallons with the usage of EarthTec in the often-mentioned Lake DeForest, a damned Hackensack River reservoir in Rockland County.

Discussions with local scientists such as Greg Boyer, SUNY-ESF, city of Syracuse officials, and EarthTec representatives have taken place over the past five to six months to understand the potential efficacy and benefit of this product versus the risk to ecology and water quality, especially during a HAB, or harmful algal bloom, event.

During this investigation from the special committee of the board, concerns about using another form of copper sulfate -- that is, EarthTec -- in addition to the significant copper load already within the ecosystem and sediment of Skaneateles

Lake is from over half a century of previous use from the 1920s -- documented from the 1920s through 1976 by the city has been addressed by our special committee.

Questions that have come up -- one, shouldn't sediment depositional levels of copper be analyzed and studied before even more is added to the lake's ecosystem?

Aren't there state and federal guidelines for limits on copper deposition in lake sediments?

Furthermore, are there concerns about treating a potential organic toxin-producer such as cyanobacteria, Microcystis, compared to an inorganic -- potentially toxic inorganic substance such as EarthTec copper which permanently accumulates in the lake sediment.

Would the city's shoreline application of this product even reach their intakes prior to diffusion throughout the lake pending wind, currents, dilution, as outlined in the permit application, confined to the northern basin of the lake during a HAB event?

Furthermore, shouldn't the city's pesticide management plan, PMP, be all worked out and stated prior to the SPDES permit approval by the

DEC and not, as is written on page 2, "within a month of the effective date" of the approved permit?

Also, the potential for increased release of toxin from the destruction and dying of cyanobacteria cells, whether the cell membranes or lysed or not, with the use of such pesticides, algicides during a HAB event, and this has been recognized by scientists and the EarthTec company itself.

The permit application on page 3 states, "due to the potential for pesticide byproducts resulting from application during a HAB outbreak, the proposed application of copper sulfate to Skaneateles Lake requires additional site-specific monitoring and operating conditions to avoid adverse environmental impact such as actually increasing the levels of toxic microcystin from the release of damaged cyanobacteria cells from the pesticide itself."

The permit application also states on page 2, under the title "Special Conditions," "the city must collect and analyze a sample from microcystin concentration once within 24 hours following treatment within 100 feet of these beach's reservoirs: Skaneateles Country Club bathing area,

village of Skaneateles pier, New York State DEC boat launch. Sampling must continue daily for 14 days following treatment unless the microcystin concentration is less than 4 micrograms per liter."

By the way, the Skaneateles Sailing Club is not included in this list above here, but it's also within the proposed treatment area, as stated in the SPDES permit.

Further questions. Has all of the above been thoroughly investigated enough by the EarthTec company and/or DEC in a lake such as Skaneateles to allow such a treatment?

What are the comparisons? Have there been any other natural lakes of this size and capacity, especially those that have filtration avoidance waivers, treated with EarthTec?

Is the risk versus benefit ratio tipped too much toward the risk side?

With the levels of microcystin experienced from the lake-wide harmful algal bloom in 2017 and the little impact it had on the municipal water at that time, using the existing tools in their toolbox, is this potential risk worth taking at this time?

Is the risk versus benefit tipped too much

towards the risk side?

Finally, shouldn't this be considered "experimental use" of such a product, EarthTec, in Skaneateles Lake, with over 200,000 folks drinking this water? Thank you very much.

JUDGE MCBRIDE: Thank you very much.

I'm going to recall Julie Abbott. Ms. Abbott, if you've joined us by telephone, please press star 3 on your phone so we know which line to unmute, and we will unmute your telephone line for you to make your comment.

Julie Abbott, if you've joined us by phone, please press star 3 on your phone, and we will unmute your line.

Then we have call-in user number 22 has raised their hand. Go ahead. Ms. Abbott, are you there?

JULIE ABBOTT: Can you hear me?

JUDGE MCBRIDE: Yes, we can. Go ahead.

JULIE ABBOTT: This is honestly one of the -- I represent Skaneateles Lake watershed, Otisco Lake watershed, Onondaga Lake watershed, and Owasco Lake watershed. And my very trying to dial in and the communication, or what I would call gross lack thereof, is a major concern of mine.

We haven't had -- I literally spent 23 minutes pulling into bridges, whatever, doing what I have to do to be able to communicate tonight.

I remember the initial communication put forward. I don't have a stance either way. My interest is my shareholders that I represent, and I am here to tell you they have no idea on the shore of Skaneateles Lake. The country club that is named in the permit wasn't even notified.

And for these reasons, I'm asking you to put the brakes on. I understand needing a filtration avoidance waiver. You haven't had cyanobacteria in the filtration pipes, and I am concerned.

I understand the rhetoric that, oh, it's just another tool in the bag. But if I live where I live, and I'm representing people, another tool in the bag could be dead fish, dead vegetation, economic impact, lack of quality of life, and absolute lack of transparency, which is my main reason for speaking tonight.

You go up and down the street, the people whose very backyards are to be affected, and I'm here to tell you, and you should do this, they have no clue. No clue.

This is a slow-moving freight train that the moment it may be deemed necessary by this administration or somebody ten years from now, people will be shocked. And I am all about communication. And I'm having this -- I'm struggling with this.

I'm struggling with (audio disruption) the M to speak yesterday on this topic. Where was the effort? Where was the --

THE REPORTER: Ms. -- I'm sorry --

JULIE ABBOTT: -- effort back in --

THE REPORTER: Ms. Abbott, I'm so sorry to interrupt. This is the court reporter. Your phone cut out a little bit there. You were talking about the people that were going to be shocked. And you said you're all about communication. And it was at that point that your line cut out --

JULIE ABBOTT: Yes.

THE REPORTER: If you wouldn't mind repeating --

JULIE ABBOTT: Thank you so much. Oh, my -- I'm so sorry. Thank you so much.

So yes. So my concern is communication. And if you were to talk to the lake homeowners whose backyards this directly impacts, including the

country club, including the -- the village storefront owners, I'm sure they would be -- I've informed them, and nobody had -- as a legislator, I've just let them know this is happening and shared the viewpoint.

They -- they don't know what's going on until I -- I -- I am not for or against. I am here to say transparency is key. I don't see the urgency. There is no urgency. I understand the filtration avoidance waiver is critical to this -- Syracuse.

And my Skaneateles watershed, like everybody that lives in the watershed, they're critical to me. And I ask that they be part of the communication.

You -- we can say this is the process. Already, in August, a process was violated. It wasn't given the due diligence. It was jammed in the back of the Skaneateles Press. I'm so -- I'm very appreciative that the DEC noted that it didn't read the -- meet the requirements, and we extended that. I just think that direct communication and bringing people along this is where it should be in good government.

And I just -- I would like to see a

comprehensive study like -- I don't see this as this critical, immediate thing. I think we can take our time to gather. We all want the same goals.

I'm deeply concerned about any potential kill a fish or vegetation as it pertains to water quality, et cetera, and for that reason I'm asking you to please put the brakes on this. I don't see the urgency. I just don't.

And I don't think that due diligence to communicate with the people we serve in New York state, Onondaga County, village of Skaneateles, town of Skaneateles and otherwise has been served in this process.

So thank you for this. I apologize for a bad connection. I'm literally driving from Syracuse to Skaneateles, and so I apologize for that.

JUDGE MCBRIDE: Thank you for joining this evening. I'm going to ask you to press star 3 on your phone again to lower your hand, and then we'll know that you're done making your comment. Again, thank you, Ms. Abbott, for joining us this evening.

I'm going to recall Suzanne Guske-Klowski. If you've joined us by telephone, if you could press star 3 on your phone, and we'll know to unmute your telephone line.

Suzanne Guske-Klowski, if you've joined us by telephone, please press star 3 on your phone, and we will unmute your phone line.

Okay. I don't see a raised hand right now, and I don't see Suzanne on our list of attendees by the internet, so I'm going to move on to our next speaker, and we will try her again shortly.

Our next speaker is Paul Torrisi, Jr. If there's a Paul Torrisi, Jr. who has joined us, if you have joined us by telephone, please press star 3 on your phone and let us know you're on the line, and we will unmute your line.

If that's the same Paul Torrisi who already spoke, if you could just raise your hand, Mr. Torrisi, over the internet, and let us know that that's already you who made their comment. Then we won't call you again.

Okay. I don't see a Paul Torrisi, Jr., and I don't see a raised hand yet, so I will go on to our next speaker.

And our next speaker is Mary Torrisi. If Mary Torrisi has joined us, I would ask that she please press star 3 on her telephone to raise her hand, and we will unmute your line. Mary Torrisi,

if you've joined us by phone, please star 3 on your phone to unmute your line, and we will unmute your line and let you make your comment. Mary Torrisi.

And if Mary has joined us under another person's name on the internet and you would like to make a comment, I would just ask you to raise your hand, and we will know to unmute the line. Mary Torrisi.

Okay. I don't see any raised hands right now, so I'm going to call our next speaker, Frank Moses. And I saw Mr. Moses' name on our list of attendees, so if we could unmute Frank Moses' line, and he can make his comment.

Go ahead, Mr. Moses.

FRANK MOSES: Thank you, Judge McBride.

Can everyone hear me?

JUDGE MCBRIDE: Yes, we can. Go ahead.

FRANK MOSES: Great. Thank you again.

Thanks to Paul Torrisi and Rich Hole for their comments as well. As mentioned, my name is Frank Moses. I'm the Executive Director of the Skaneateles Lake Association, also known as SLA, whose mission, in short, is to promote the protection of Skaneateles Lake.

Tonight we are voicing our opposition to

the DEC permitting the use of EarthTec as an algicide on Skaneateles Lake. When SLA was made aware of the permit application being submitted, we immediately put a task force together in which our Board President, Paul Torrisi, had already mentioned. So many are listening in tonight and participating this evening, and many thanks to them as well.

Our team also consulted with Rich Abbott of the City of Syracuse Water Department and Dr. Gregory Boyer, as Paul mentioned as well, the guy from Boyers, a local researcher from SUNY-ESF, an expert in regards to cyanobacteria found in harmful algal blooms. Many thanks to Rich and Greg for their time as well in exploring this issue.

One of the first and primary interests SLA had was to see that the community was made aware of the permit application and SLA's associated concerns. As a result, I want to thank the hundreds of stakeholders who also responded with their concerns and continue to do so.

Their support, along with some of our elected officials you've already heard from tonight, seemingly led to a public information meeting being held in addition to this public hearing tonight.

Having a well-informed community regarding issues like this is extremely important to our mission, and we appreciate the decisions made by the DEC and efforts of the city of Syracuse to facilitate this public engagement.

We represent well over a thousand members that entrust our leadership to address issues that can impact the quality of Skaneateles Lake. This permit application we're discussing is certainly one of those issues.

This evening, I wanted to highlight a few of the main concerns that have arisen over the past several months and are reflected in the letters we submitted to the DEC in August, September of 2021, and this past February of 2022, and are available on our website Skaneateleslake.org, for those that are listening and curious to see what we've submitted.

Firstly, the overarching conclusion from our leadership is that there's not enough information given by the applicant nor the experts affiliated with EarthTec that provide reasonable assurances to the community.

This is in regards to the treatment procedures, monitoring, and evaluation, effectiveness of the proposed treatment, and

assessment of potential and short and/or long-term negative impacts to aquatic life in the lake.

There are various reasons that SLA is opposed to the treatment of cyanobacteria by EarthTec at this time. But for the sake of time, I'm going to highlight one of the major concerns closely related to our mission and the water quality of the lake.

Simply put, why would it make sense to add a chemical with copper to a lake that currently has too much copper in its sediment?

On a recent Environmental Protection Agency master label for EarthTec, it states the following under environmental hazards, "This pestcide is toxic to fish and aquatic invertebrates. Waters treated with this product may be hazardous to aquatic organisms."

I'm not repeating myself. This is a continuation of the label saying, "This copper product is toxic to fish and aquatic organisms. Unlike most organic pesticides, copper is an element and will not break down in the environment and will, therefore, accumulate in sediment with repeated applications." End of master label notation there.

Based on DEC data and recent data provided

by Syracuse University researchers, Dr. Charlie Driscoll, Dr. Chris Sholz, and Mackenzie Brannon, there's evidence that there are copper levels that, according to the assessment tools within the DEC, would require more evaluation regarding impacts to aquatic life.

We ask that the DEC refer to those screening and assessment tools noted in our letters. In the decision-making process, it's also very much recommended that along with the short-term impacts associated with use of EarthTec, that the potential long-term impacts on Skaneateles Lake, with current unacceptable levels of copper, are strongly considered.

I recently read a study titled "Side Effects of 58 years of copper sulfate treatment of the Fairmont Lakes in Minnesota," which is not far off from the amount of year where copper sulfate was at in the Skaneateles Lake in the 1920s to 1970s.

The study notes negative impacts on fish and aquatic insect populations, increased tolerance of algae to higher copper sulfate doses, a shift from green algae to more cyanobacteria, and disappearance of aquatic vegetation.

The study is still referred to in current

watershed plans in Minnesota by their Department of Natural Resources like the Lake Koronis Management Plan and should be considered in this case as well with the permit application.

Lastly, we are on here regarding great care and concern for Skaneateles Lake and have many anxieties when it comes to the threats associated with harmful algal blooms. But we must consider and invest in more benign alternatives when HABs happen and work more collaboratively to prevent their frequency and toxicity in the future.

I thank the DEC, the City of Syracuse, and all our community partners and members for their willingness and commitment to continue to protect Skaneateles Lake for the benefit of current and future generations. In this, we all have a sincere moral obligation to abide by and adhere to. Thank you.

JUDGE MCBRIDE: Thank you, Mr. Moses.

I have called on all the people who have registered to speak, and I don't see the two people who we called that were not in attendance when I called their names.

So I'm going to ask people who are in attendance who would like to make a comment who did

not register to speak to raise their hand.

And I'll note that we have someone by the name of Bob Honold on the line who's raised his hand. So if we could unmute his line. Thank you.

Mr. Honold, did you want to make a comment?

BOB HONOLD: Yes. Can you hear me?

JUDGE MCBRIDE: Yes, we can. Go right ahead.

BOB HONOLD: Yeah. I know you're not allowing for questions, so I'll do my best not to ask one, but I was just looking for clarification.

Did I hear earlier that tomorrow is the final day for any comment on this?

JUDGE MCBRIDE: That's correct.

BOB HONOLD: Given the really nice comments from everyone who's spoken, I was -- it seems like there's certainly push for a delay in taking action on this.

In the absence of being able to provide any commitment to delaying taking action, could the comment period be extended, or is that not an option at this point?

JUDGE MCBRIDE: Well, I actually am not in a position to answer that question right now, but if

you'd like to make another comment other than asking a question, please go right ahead.

BOB HONOLD: So I would feel very strongly, first of all, that I know some people who've not really taken a full position. My personal position would be that this is a bad idea for the reasons that were outlined by the representatives from the Skaneateles Lake Association.

But that, additionally, short -- short of going another route, I would very strongly urge that there be more than 24 hours allowed between the occurrence of this call-in meeting and the deadline for public comment.

JUDGE MCBRIDE: Thank you.

I'm going to open this up to other people who would like to make a comment this time. So first, I'm going to ask people who have joined us by the internet, if they would like to make a comment, to raise your hand.

And I'm going to, again, remind you how to make that -- how to raise your hand, and it's also on the slide right now on the screen. But first, on the lower right corner of your screen, you're going to see the word "participants," and you're going to

want to click on that.

When you click on the word "participant," you will see a small hand icon above that. If you would like to make a comment, we would ask that you please press the small hand icon, and that will raise your hand, and we will know to call on you to make a comment.

So first person that I see who has raised their hand is Lois -- Louis Martin. If we could unmute Louis Martin's line to make a comment, please.

LOUIS MARTIN: Yes, ma'am. Thank you. My name is Louis Martin. I'm known around our community as Skeeter. I'm the town of Scott supervisor, the town supervisor.

When you mentioned pesticides, it scares everybody. You're putting it into a lake of water that our residents use to drink out of. We fish out of it. We boat out of it. If something was not to go the right way, as they're planning, it would be devastating for our residents and community members.

And just wanted to say that the town of Scott was for the Skaneateles Lake Association, and we oppose allowing the permit for EarthTec. That would be it.

JUDGE MCBRIDE: Thank you. Thank you.

The next person who has raised their hand is Marybeth Carlberg. If we could unmute Marybeth Carlberg's line, please, to make a comment.

MARYBETH CARLBERG: Hi. I am a family practice physician and a member of Skaneateles Lake Association, and I have a camp near Carpenter's Point.

I'm a total newbie to this whole controversy, and my hats are off to Paul Torrisi and the talents and time that everyone's put into it. And I'm not opposing this; however, I'd like to make a little different gestalt on this whole thing.

I'm not a toxicologist or environmental expert, but I feel very safe with EarthTec when used as directed and discussed at the public information session held in October and hosted in part by Rich Abbott from the city of Syracuse.

Again, as Paul mentioned, he discussed how Skaneateles Lake has been treated multiple times in the past with copper, probably at much greater concentrations than would be used.

It's my understanding the various copper products are used in organic farming of fruit and vineyards. It's added to our vitamins. So you

know, I don't know, but there are some things I am sure of.

I am sure that the toxins that are the degradation of products and blue-green algae are dangerous. BMAA is a neurotoxin produced by all green algae.

In a couple of fascinating YouTube videos titled "KLS fishing for answers and diet in ALS," Dr. Michael Greger discusses reports about the concerns of their relationship to chronic neurologic disorders such as ALS, Alzheimer's and Parkinson's.

In particular -- I wasn't going to mention this, but I think it's fascinating -- he relates a study of the indigenous peoples of a town in Guam where one-third of the population had severe and died from ALS, Parkinson's, dementia complex.

They finally traced this to a blue-green algae that was growing in the roots of a tree that produced seeds that the bats were eating. And these people would have bat soup as part of their diet.

And he goes on to explore many other reports of these toxins being found in the brains of Alzhemier's patients where the presumed source across the country, across the world seems to be accumulation of BMAA in seafood.

He discusses contamination of marine life in the Chesapeake Bay because of the algal blooms and basin flora where very high levels of this toxin are concentrated in marine life.

Some of the things they tested had as high concentrations as those in the bats on Guam. So we do know they accumulate and concentrate in marine life.

What I do know and I am sure of is that my husband has been swimming in the lake for many, many years. And for the past few, he notices, as early as July, particulate matter in the water count that was never there before.

What I know is my friend who routinely flies over all the involved finger lakes noted early August last year algal trails behind motor boats that stretch from Mandana to miles south.

What I know is I just spent $11,000 drilling a 300-foot well at our Skaneateles camp because now I'm afraid to drink water directly from the lake. And we know HABs are only going to get worse, given our climate crisis. They're the devil we know versus one that is theoretical, copper sulfate.

I also don't know what the other options

are. I do have a sense of urgency. And I understand Paul's point about releasing toxins, you know, with the treatment, but maybe it should be done prophylactically before the bloom and get more of a prophylactic program.

But anyway, I actually wish they'd bring some of it down to my end of the lake because I'm nervous about it. That's my -- my concerns.

JUDGE MCBRIDE: Thank you.

Our next speaker is Jessica Millman. If we can unmute Jessica Millman's line, please.

JESSICA MILLMAN: Can you guys -- oh --

JUDGE MCBRIDE: Go ahead. We can hear you.

JESSICA MILLMAN: Hi. I'm Jessica Millman. I'm a resident of Skaneateles and a member of the Skaneateles Lake Association.

The granting of this permit is entirely premature due to the reasons articulated by Julie Abbott and the lack of communication to many lakefront property owners and also because of the reason articulated by so many of the Skaneateles Lake advocates who stated over and over again tonight that all of the unknowns associated with the application of this pesticide and how -- and the

impact it will have on our critical natural resource.

I'll just end with a question. And I recognize it's a rhetorical one, but you know, how many more global examples do we need illustrating the damages done when we solve one environmental problem and challenge while introducing a new one?

Again, that -- that -- there are such multitude of examples, we could spend an entire night just talking about every example that -- that has -- where we've tried to solve one problem and only created an even bigger mess. Thank you.

JUDGE MCBRIDE: Thank you. I see that Paul Torrisi has raised his hand. If we could unmute Mr. Torrisi's line again. He may have another speaker there with him.

Mr. Torrisi, go ahead. Did you have someone else who would like to make a comment?

PAUL TORRISI: Thank you, Judge McBride. Actually, my wife Mary Torrisi is here. She had -- she, like several others who have texted me during this meeting, have been unable to access the meeting for one reason or another.

But she had a few remarks she'd like to make through my computer. Thank you.

JUDGE MCBRIDE: Go right ahead. Thank you.

MARY TORRISI: Hello. My name is Mary Torrisi. One of my questions is, why does the permit request only up to two EarthTec applications to the full treatment area in a calendar year and at least 14 days between treatments in any treatment area?

What damage or toxicity is the obvious concern here? Shouldn't this be specified by the applicant?

The permit states also, "Treatment must begin closest to the shore and proceed outward in bands to allow fish to move into untreated areas." Is this to avoid massive fish kills?

If so, what else does it affect, kill, or damage? And what will be the smell left to all the lakefront owners and the townspeople?

The permit states, "Treatment shall immediately cease, and permit shall notify the New York State DEC if there are any visual evidence of biological impacts," including these fish kills, "during the treatment."

What is the incidence of such adverse effects using EarthTec, and how does it affect the

dogs in the area of the lake and the children in the area of the lake?

And how are you going to be able to notify every single lakefront owner that you're putting this chemical into our lake? Thank you.

JUDGE MCBRIDE: Thank you. If anyone knows of someone who's having difficulty getting into the hearing, I'm going to read off the phone number again for them to call. We're going to be on for a little bit longer. If you know of anyone who's having any trouble logging in, the phone number to call is (518) 402-8044.

And we have someone right now who is helping people who are having difficulty logging on, so if you know anyone that is having problems, please tell them to call (518) 402-8044.

I'm now going to ask anyone who has joined us by telephone who would like to make a comment, who has not already spoken, to please raise their hand.

So if you've joined us by phone and you would like to make a comment, you would press star 3 on your phone. That will raise your hand, and we will unmute your line.

So if there's anyone who's joined us by

phone that would like to make a comment, please press star 3 on your phone, and we'll unmute your line for you to make a comment. Again, that's star 3 on your phone line.

And again, if there's anyone who has joined us by the internet that still wants to make a comment that hasn't, you'll see on the bottom right a small hand icon, and you're going to want to click on that, and that will raise your hand, and we will know to unmute your line for you to make a comment.

So if you joined us by phone, press star 3. If you've joined us by the internet, there's a small hand icon on the right side of your screen, and you're going to want to press that, click on that, and that will let us know that you'd like to make a comment.

So I don't see anyone who has joined us by phone that has raised their hand. I don't see anyone who has joined us by the internet who has raised their hand.

Again, if you've joined us by phone, please press star 3. And if you've joined by the internet, there's a small hand icon on the right side. It looks like a raised hand. You would want to click on that, and that will let us know that

you'd like to make a comment.

I see Hamilton Fish. Hamilton Fish has a raised hand. Could we unmute that line, please.

HAMILTON FISH: My name is Hamilton Fish. I live in Mandana, approximately five miles south of the village, on the water.

The water supply for my house, as specified in the certificate of occupancy, is the lake. And I suspect that that is also true for hundreds of other homes on the lake. This is our water supply for drinking.

I find it difficult to understand how the applicant proposes to notify close to 1,000 property owners on the lake in a rapid manner that the pesticide is being applied, and they should now drink bottled water.

They need to compile a method to do that. Certainly, an advertisement in the paper, television, notice are not sufficient.

Secondly, this hearing is being held in February, just in the natural course of events, but I would notice -- note that a very large number of the property owners affected by this and who will -- are not present in the Syracuse area -- we are not, but we happen to know about the meeting through the

lake association.

I believe if this meeting were -- hearing were held in the summer months and adequate notification is provided, you would have additional comments.

Mary Torrisi had pointed out that the application progresses from the shore outward to encourage the fish to move out away from the affected area.

Living on the waterfront, I live in an area designated on a fishing map as a prime fishing area at the mouth of a brook. I can tell you that the heavy fish concentration is probably within 100 feet of the shoreline there.

Those fish are not going to move out. The fish are going to be there. The consequences of the application of the pesticide will either be impacted in the fish that are caught or in the fish themselves.

It is -- I strongly object to the permit to allow application of copper sulfate to this lake. As already pointed out, there is sufficient copper accumulated in it. I also know that in the 1970s and 80s, I owned a property on Onondaga -- on Lake Ontario on Little Sodus Bay.

And at that time, the SE -- the -- the permitting department -- excuse me. It slipped my mind, but in any case, they prohibited the use of copper sulfate, which I and others have been using to preserve the wood on their docks, to treat weeds and other things because it was considered hazardous to the health of those there.

And we did not take our drinking water from the lake at that time. So it seems rather incongruous to me now that application of copper sulfate would be permitted in an area known to be a drinking water supply. Thank you.

JUDGE MCBRIDE: Thank you.

We have a raised hand from Victor Duniec. If we could unmute his line.

And if I mispronounced your name, I apologize. Please correct me. Go ahead, sir.

VICTOR DUNIEC: This is Victor Duniec. Can you hear me?

JUDGE MCBRIDE: Yes, we can.

VICTOR DUNIEC: Oh, thank you very much. Thank you for the opportunity to have this meeting. I have to apologize sincerely. I am a new property owner, and this is the first I'm hearing of any of this.

I do live on the lake, and I would like to voice my opinion that we should table this matter until further information can be gathered on it. It seems like it's going in a fast pace here, and it doesn't seem like we're getting all the information we should be getting. That's the only point I need to make. Thank you.

JUDGE MCBRIDE: Thank you.

Our next speaker is James Tifft. Go ahead, Mr. Tifft.

JAMES TIFFT: Am I unmuted now?

JUDGE MCBRIDE: Yes, you are. Go right ahead.

JAMES TIFFT: Okay. I'd like to say this has been a very, very excellent meeting. It's been well represented. I'm also from the SLA.

I simply feel that there are two issues. One is the uncontrolled release of microcystin toxin, and the third -- and the second is the deposit of copper in the sediment, which is irreversible.

And there are some toxicities that we know about copper. I'm a liver specialist, and the extreme has been Wilson's Disease. But I got to say that, you know, it's something that really needs to

look -- be looked at a lot more.

I really appreciate the -- the event tonight. I really appreciate this. Thank you.

JUDGE MCBRIDE: Thank you.

Our next speaker is Virginia Calvert.

VIRGINIA CALVERT: Good evening. I guess I'm unmuted.

JUDGE MCBRIDE: Good evening. Yes, we can hear you. Go right ahead.

VIRGINIA CALVERT: Yeah. So I also had issues with the website here. I was on the meeting, and then now I can't see the screen anymore, but you can still hear me.

I'm a member of the lake association. I think everyone who lives on the lake or has business in Skaneateles should be a member of the lake association. They're the ones that are doing the sort of holistic research on this, and they're the ones that are urging and lobbying for our government to do the right thing.

So I have a place on the lake, but it's not where you're planning on giving notice, and I think it's wrong that all lakefront owners wouldn't be given notification -- I mean, notice. And, you know, Julie hit it -- hit the nail on the head that,

you know, frankly, the way we give notice of things to people these days is archaic, and we need to fix that.

And that's not what we're to do at this point in time, but we need to consider that this kind of impact to a water supply for so many people needs a different approach. And the city of Syracuse, I don't think, has invested what they need to in the lake, and this looks like a short-term solution to a long-term problem. That's my comment. Thank you.

JUDGE MCBRIDE: I don't have any other raised hands, and we have not had anyone else call in to say that they're having trouble raising their hand or logging in.

For information purposes, because I know that you can't tell when you have joined as a member of the public, but we had approximately 78 people on -- oh, I'm sorry.

I see a raised hand now from David Miller. Can we please unmute David Miller's line?

Go ahead, Mr. Miller. Mr. Miller, you've been unmuted on our line. If you maybe have your own phone or computer muted, you may have to unmute that. David Miller, you've been unmuted, but we

can't hear you. You may be muted on your end. If you want to check your phone or your computer to see if your microphone is muted or your phone is muted.

Okay. David Miller, you have been unmuted. We'll try Mr. Miller again in a few minutes.

I see we have a raised hand from Jack Riley. If you could unmute Jack Riley's line, please.

Go ahead, Mr. Riley.

JACK RILEY: Thank you. Am I audible?

JUDGE MCBRIDE: You are.

JACK RILEY: All right. I appreciate being recognized. I just want to underscore a point that Hamilton Fish made earlier.

I'm a part-time resident, and the only reason that I know about the hearing is through my membership with the Skaneateles Lake Association.

As somebody else mentioned, only a small fraction of property owners are members of the SLA, but I do think there's a unique challenge of communicating with people who are part-time residents or not full-time residents, so I simply want to underscore that point that was made earlier. Thank you.

JUDGE MCBRIDE: Mr. Marley, why don't we try to unmute David Miller's line again to see if he's able to make his comment now.

David Miller, your line has been unmuted, and you have raised your hand, if you're with us. You may be muted on your line. David Miller. Okay.

In looking at our list, I don't see anyone else who has raised their hand. I'll remind you again if you've joined us by telephone and you would like to make a comment, please press star 3 on your telephone now, and that will alert us that you would like to make a comment.

If you've joined us by phone, please press star 3 on your telephone to let us know you would like to make a comment, and we will unmute your line.

I see that we have a raised hand from James Richardson. If we could unmute James Richardson.

Go ahead, Mr. Richardson.

JAMES RICHARDSON: Hello.

JUDGE MCBRIDE: Yep, go ahead.

JAMES RICHARDSON: Hi. I just wanted to read a note from a source on the internet that the summation is the -- "the chemical kills the algae

which then sinks to the bottom of the pond, where it decays and releases additional toxins which can create more blooms, essentially resulting in a larger problem than you started with."

And it doesn't treat the causes of the algae in your pond, which is a big problem. And I've written a comment by email as well, so that can be read. Thank you.

JUDGE MCBRIDE: Thank you.

Okay. And again, if you've joined us by phone and you'd like to make a comment, please press star 3 on your phone. If you've joined us by the internet and you would like to make a comment, you will need to click on the raised hand feature.

At the bottom right of your screen, there's a small hand. You want to click on that to let us know that you'd like to make a comment, and we will unmute your line.

And I will note that we don't have any other raised hands right now, and I'm going to give it another minute.

I'm going to read the address again for mailing in and for emailing comments. So, again, comments should be emailed by 5 p.m. tomorrow or postmarked by tomorrow. The email address, again,

is comment -- c-o-m-m-e-n-t --
.skaneateles2021@dec.ny.gov.
Skaneateles2021@dec.ny.gov.

And if you'd like to submit your comments by mail, please send them to Karyn Hanson, H-a-n-s-o-n, New York State DEC, Division of Environmental Permits, and the address is 625 Broadway, Fourth Floor, Albany, New York 12233-1750. And again, that's Karyn Hanson at the New York State DEC, Division of Environmental Permits, 625 Broadway, Albany, New York 12233-1750.

And I see we have a Kathleen Morris (sic) who would like to make a comment. If we could unmute Kathleen Morris' line.

KATHLEEN MORRISSEY: Hi, good evening. Can you hear me?

JUDGE MCBRIDE: Yes, we can. Thank you.

KATHLEEN MORRISSEY: Okay. Yes. This is Kathleen Morrissey. I'm a village resident in Skaneateles here.

Thank you for offering this session. I'd just like to say that I echo the sentiments of all the representatives of the Skaneateles Lake Association. They're a group of individuals who dedicate much time and effort to their mission.

The comment I'd like to make is, is this potential risk really worth taking at this time? It seems a very hasty decision would be made without the public being very well informed. And that is all for my comment at this time. Thank you.

JUDGE MCBRIDE: Thank you very much.

Okay. I'm still checking our list to see if anyone has raised their hand. Right now, I don't have any other raised hands either from call-in users or people who have joined us over the internet. Let me check our list one more time.

I do not have any more raised hands. I will note that it's about 7:09. No one has tried to reach our phone number to let us know that they're having trouble getting through. I believe we have called everyone who has raised their hand and indicated they'd like to make a comment or who registered to comment.

And I'll give one more call. If anyone would like to make a comment, if you've joined us by telephone, please press star 3. If you've joined us by the internet, please click on the raise hand feature on the right of your screen. It looks like a raised hand.

I will note that looking at our list, I do

not see any other raised hands. I will give it another minute. Let me make sure we've given everyone an opportunity to make a comment.

And again, if you would like to see the hearing notice for this evening's hearing, it's on the DEC calendar, which is on the front page, the home page of the DEC, which is dec.ny.gov, and there's a calendar in the middle of our home page.

And if you go to today's date, there will be a notice for tonight's hearing, and all the information is right there. If you click on that link, there will be the mail-in address and all the information from the hearing notice that was published in both the Post Standard and the Skaneateles Press and also put on the DEC's environmental notice bulletin electronic publication.

Okay. I'll note that we have no other raised hands. So again, the email address is comment, singular -- c-o-m-m-e-n-t -- .skaneateles2021@dec.ny.gov. And if you want to mail in comments, it's Karyn Hanson at the New York State DEC, Division of Environmental Permits, 625 Broadway, Fourth Floor, Albany, New York 12233-1750.

On behalf of the DEC -- oh, I apologize.

I have one more raised hand. Melissa Pavlus. If we could unmute that line, please.

Go ahead.

MELISSA PAVLUS: Hello. Can you hear me?

JUDGE MCBRIDE: Yes, we can. Go right ahead.

MELISSA PAVLUS: Hi. Thank you so much for offering this opportunity for all of us to talk and submit our comments.

I just want to make a quick note that I have been searching for the raised hand button in the bottom right corner, and on my screen, in case anyone else is experiencing the same thing, it was actually on a little button with three vertical dots to the left of the red X, so that's why I wasn't able to find it. And it just has taken me this long.

But I just want to echo all of the comments that I've heard tonight in opposition of this. I've been quite surprised at the lack of participation, especially in such an involved and committed community. And perhaps that is due to the notification.

And for that reason and for the lack of transparency with, perhaps, the notification for

this, I would urge you to pause and to halt this application being approved. And I just want to thank you for the opportunity to talk tonight. That's it.

JUDGE MCBRIDE: I apologize if anyone is having difficulty finding the raise hand feature. As I stated, this -- and as you all know, we're using the Webex platform. Because of the ongoing pandemic, at this point we are still doing remote hearings. And unfortunately, from time to time, Cisco will update the features of Webex, and we are not always notified of that update. So I apologize.

If anyone is having difficulty, there is a red X at the bottom of your screen and to the left of that are three dots. And I believe that Ms. Pavlus indicated that when she clicked on that, that's where she found the raise hand feature. It's not where it's located on my screen, so I apologize.

If there's anyone that has been having difficulty finding that, I'll give you another minute to see if you'd like to raise your hand.

And I'll note that I don't have any other raised hands. And again, on behalf of the DEC, I want to thank everyone for taking the time to join us here this evening and for putting your comments

on the record.

Oh, I apologize. I have one more raised hand now. Emily Konrad. If we could unmute Emily Konrad, K-o-n-r-a-d.

Go ahead, Ms. Konrad. You have been unmuted on our end. You may need to unmute yourself on your end. Emily Konrad, we have unmuted your line.

Emily Konrad, you have been unmuted on our end. You may be muted on your end. If you could check that. Or perhaps you did not wish to make a comment. You may have mistakenly indicated that you did. Emily Konrad, last call. You may be muted on your end. We have unmuted you on our end.

Okay. And I am, again, going through our list of attendees, looking again to see if anyone has indicated they'd like to make a comment. And I have no other raised hands.

So, again, thank you for taking the time this evening. Thank you for participating, and again, until 5 p.m. tomorrow, you may submit emails, and you may submit your comments by mail as long as they're postmarked by tomorrow.

And, again, if you missed the address or want to see it again, it's on the screen right now.

And it's also at the DEC home page on our calendar, which is on our home page, DEC.ny.gov.

Again, on behalf of the DEC, I thank everyone for joining us this evening. And we will now close our hearing. Have a nice evening. Thank you very much.

THE REPORTER: And Ms. Katchmar, this is Jennifer, the reporter. And I just wanted to ask you, would you like to order the transcript of this hearing?

JUDGE MCBRIDE: I believe -- this is Molly McBride. I believe we have your email address for your company, so we can reach out to them?

THE REPORTER: Correct.

JUDGE MCBRIDE: Right. So I think the city of Syracuse will reach out to you to make those arrangements. They do need a copy of the transcript, yes.

THE REPORTER: Okay. Sounds good. And just in case I need to reach Ms. Katchmar, may I please have your email address? I may have some spelling questions once we start to process.

JUDGE MCBRIDE: Sure. I'll tell you what, I'll give you a phone number, how's that?

THE REPORTER: Sure thing.

JUDGE MCBRIDE: (518) 402-8044.

THE REPORTER: Great. Thank you.

JUDGE MCBRIDE: Thank you.

And good night, everyone.

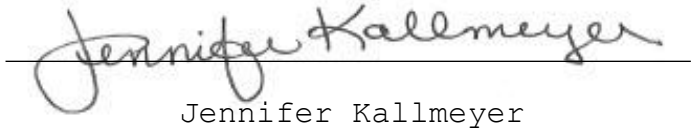
(Whereupon, the public hearing concluded at 4:17 p.m.)

CERTIFICATE

I, Jennifer Kallmeyer, do hereby certify that I reported all proceedings adduced in the foregoing matter and that the foregoing transcript pages constitutes a full, true and accurate record of said proceedings to the best of my ability.

I further certify that I am neither related to counsel or any party to the proceedings nor have any interest in the outcome of the proceedings.

IN WITNESS HEREOF, I have hereunto set my hand this 12th day of March, 2022.



Jennifer Kallmeyer

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Appendix C: EarthTec Label and Registration Documents

EARTHTEC® ALGAECIDE/ BACTERICIDE*

For Impounded Waters, Lakes, Ponds, Reservoirs, Livestock Watering Systems, Potable Water Supplies+, Sedimentation Basins and Ornamental Water Features or Fountains; and Equipment/Structures that deliver water directly to publicly owned water treatment facilities to include pipes, intake structures, gatehouses, screens, pumping stations, weirs, and penstocks.
For Irrigation Conveyance Systems, Irrigation Reservoirs, Irrigation Canals and Ditches.
Bactericide* - Nonpublic Health Bacteria
Potable Water Supplies+ - Water Destined to Be Used as Drinking Water (this water must receive additional and separate potable water treatment)

ACTIVE INGREDIENT
Copper Sulfate Pentahydrate*(CAS No. 7758-99-8).....19.8%
OTHER INGREDIENTS.....80.2%
Total.....100.0%
*Metallic Copper 5%

THIS PRODUCT WEIGHS 9.91 LB. PER GALLON - 1.188 kg/L.
AND CONTAINS 0.493 LBS ELEMENTAL COPPER PER GALLON

Manufactured by: Earth Science Laboratories, Inc.
113 SE 22nd Street, Suite 1
Bentonville, AR 72712
Phone: (800) 257-9283

EPA REGISTRATION NO. 64962-1
EPA ESTABLISHMENT NO. 64962-NE-001

NET CONTENTS:

☐ TANKER

BATCH NO.

NSF Certified to NSF/ANSI 60

KEEP OUT OF REACH OF CHILDREN

WARNING • AVISO

If you do not understand this label, find someone to explain it to you in detail.
(Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.)

FIRST AID

IF IN EYES: Hold eye open and rinse slowly and gently with water for 20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for advice.

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything to an unconscious person.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of soap and water for 15 to 20 minutes. Call a poison control center or doctor for treatment.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact INFOTRAC 1-800-535-5053 for emergency medical treatment.

SEE ADDITIONAL PRECAUTIONARY STATEMENTS ON THE SIDE OR BACK PANEL.

PRECAUTIONARY STATEMENTS
Hazards to Humans and Domestic Animals

WARNING

Causes substantial but temporary eye injury. Harmful if swallowed. Harmful if absorbed through skin. Do not get in eyes or on clothing. Avoid contact with skin. Wear protective eyewear (goggles, face shield or safety glasses), long sleeved shirt, long pants, shoes, socks and chemical-resistant gloves made of any waterproof material. Some materials that are chemical-resistant to this product are polyvinyl chloride, polyethylene and viton. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and aquatic invertebrates. Waters treated with this product may be hazardous to aquatic organisms. Treatment of aquatic weeds and algae can result in oxygen loss from decomposition of dead algae and weeds. This oxygen loss can cause fish and invertebrate suffocation. To minimize this hazard, do not treat more than ½ of the water body to avoid depletion of oxygen due to decaying vegetation. Wait at least 14 days between treatments. Begin treatment along the shore and proceed outward in bands to allow fish to move into untreated areas. Consult with the state or local agency with primary responsibility for regulating pesticides before applying to public waters to determine if a permit is required.
Certain water conditions including low pH (≤6.5), low dissolved organic carbon (DOC) levels (3.0 mg/L or lower) and "soft" waters (i.e. alkalinity less than 50 mg/L) increases the potential acute toxicity to non-target aquatic organisms. The application rates on this label are appropriate for water with alkalinity greater than 50 mg/L. Do not use these application rates for water with less than 50 ppm alkalinity (e.g., soft or acid waters) because trout and other species of fish may be killed under such conditions.
Consult your local state fish and game agency before applying this product to public waters. Permits may be required before treating such waters.
For applications in waters destined for use as drinking water, those waters must receive additional and separate potable water treatment. Do not apply more than 1.0 ppm as metallic copper in these waters (background + applied copper).

PERSONAL PROTECTIVE EQUIPMENT
USER SAFETY REQUIREMENTS

Mixers, loaders, applicators and other handlers must wear the following:

- Long-sleeved shirt
- Long pants
- Shoes plus socks
- Chemical-resistant gloves made of any waterproof material (Chemical Resistance Category A)
- Protective eyewear

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent material that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

USER SAFETY RECOMMENDATIONS

- Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Users should remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Users should remove PPE immediately after handling this product. As soon as possible, wash thoroughly and change into clean clothing.
- Wash the outside of gloves before removing.

Always refer to the label <u>on the product</u> before using EarthTec or any other product.

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirement specific to your state and tribe, consult the agency responsible for pesticide regulation.

USE INFORMATION

EarthTec® is used to control algae and to suppress nonpublic health bacteria and bacteria that cause taste and odor problems in impounded waters, lakes, ponds, lagoons, wastewater lagoons, reservoirs, livestock watering systems, potable water supplies, sedimentation basins, ornamental water features or fountains, and equipment/structures that deliver water directly to publicly owned water treatment facilities to include pipes, intake structures, gatehouses, screens, pumping stations, weirs, and penstocks.

EarthTec® is used to control algae and to suppress nonpublic health bacteria and bacteria that cause taste and odor problems in irrigation conveyance systems, irrigation reservoirs, irrigation canals and ditches.

EarthTec® is an algaecide/bactericide*/molluscicide consisting of a soluble formulation of copper. EarthTec®'s proprietary formulation ensures that the active ingredient – metallic copper – is delivered in the form of the biologically available cupric ion, Cu++.

Before treating bodies of water, consult NPDES permitting authorities. Do not exceed a free metallic copper concentration (background + applied copper) in treated water of 1.0 ppm (mg/L), equivalent to 16.7 mg/L of EarthTec®.

This product has diffusional properties that move the ions through the water according to physical conditions. The product will stay soluble in the water until the ions are taken up by the algae/bacteria (non-public health) or affected by physical properties.

The product may be applied throughout the year. Apply when algae first appear. Apply based on the volume of water to be treated. The dose rates are variable and depend upon algae species, amount of algae present, water hardness, water temperature, turbidity and flows. Higher doses may be required for lower water temperatures, higher algae concentrations, and for hard waters. See Specific Directions for Use.

For control of planktonic algae, use a dose rate near the lower end of the labeled range. Dose near the higher end of the labeled range for rooted or stemmed species including Chara, Nitella, and filamentous algae. If there is uncertainty about the dosage, begin with the lower dosage and increase until algae control is achieved or until the maximum allowable level has been reached.

When treating flowing waters use a metering pump or similar means to apply a continuous dose so as to achieve a final dilution within the recommended range. See Specific Directions for Use.

USE IN CONTROL OF ALGAE, NONPUBLIC HEALTH BACTERIA, AND BACTERIA THAT CAUSE ODOR PROBLEMS

For algae control, apply in the late spring or early summer when algae first appear. The dosages are variable and depend upon algae species, water hardness, water temperature, amount of algae present, as well as whether water is clear, turbid, flowing or static. Preferably, the water should be clear with temperature above 60 degrees F (15.6 degrees C). Higher dosages are required at lower water temperatures, higher algae concentrations and for hard waters. See Specific Directions for Use. EarthTec® is soluble and will quickly disperse. EarthTec® application for 3 acres or less may be poured directly into ponds, small lakes and reservoirs. EarthTec® application for 3 acres or more should be applied at several points in the ponds, lakes or reservoirs. Larger bodies of water can be treated with EarthTec® by dragging a feeder hose behind a boat across the body of water or dispensing via conventional spray equipment mounted to a boat, helicopter or airplane. EarthTec® will quickly diffuse throughout the water body in several hours; broad distribution of the product will speed dispersal and provide quicker control of algae. EarthTec® may be applied to irrigation systems by a drip system or feeder pump according to the flow volume. Use higher dosages for Chara, Nitella and filamentous algae, and lower dosages for planktonic algae. If there is uncertainty about the dosage begin with the lower dosage and increase until control is achieved or until the maximum allowable level has been reached. See Specific Directions for Use.

Treatment of algae can result in oxygen loss from the decomposition of dead algae. This loss can cause fish suffocation. If the algae cover more than 1/3 of the total water area, treat in sections. Treat ½ of the water area in a single operation and wait for 14 days between treatments. Begin treatment along the shore and proceed outward in bands to allow fish to move into untreated areas. In regions where ponds freeze in winter, treatment should be done 6 to 8 weeks before expected freeze to prevent masses of decaying algae under an ice cover. Before treating bodies of water, consult proper state authorities such as the fisheries commission or conservation department to obtain any necessary permits. For use in controlling algae and cyanobacteria at all aquatic application sites do not exceed a copper concentration in water of 1.0 ppm of metallic copper concentration (background + applied).

For example, if you wish to achieve 1.0 ppm of metallic copper, 1 gallon of EarthTec® added to 60,000 gallons of water is equal to 1.0 ppm metallic copper. In order to attain 1.0 ppm of metallic copper in the treated water, the amount of EarthTec® added to a water body is equal to the gallons of water being treated divided by 60,000 multiplied by 1 (e.g., see Gallons of EarthTec® and Water table below). Use volumetric measurement devices that are calibrated in accordance with manufacturer specifications.

Gallons of EarthTec® and Water

Gallons EarthTec®	Gallons Water	Metallic Copper (ppm)
0.1 (0.4 quarts or 0.8 pints)	6,000	1.0
¼ (1 quart)	15,000	1.0
1	60,000	1.0
1 2/3	100,000	1.0

Use formula for calculating water volume and flow rates. Calculate the volume of water (multiply the average depth by surface area). To calculate the gallons of water multiply the volume in cubic feet times 7.5. One cubic foot per second of flow equals 27,000 gallons/hour. One acre foot equals 326,000 gallons. See below for additional directions on methods of application to flowing water.

SPECIFIC DIRECTIONS FOR USE

To Control Algae, Nonpublic Health Bacteria, and Bacteria That Cause Odor Problems in Irrigation Reservoirs, Impounded Waters, Lakes, Ponds, Lagoons, Reservoirs, Livestock Watering Systems, Potable Water Supplies+, Sedimentation Basins and Ornamental Water Features or Fountains: For fish-bearing lakes, ponds, drinking water reservoirs, irrigation canals and other applications, apply at the rate of 1 quart of EarthTec® per 250,000 gallons of water, or 1 gallon of EarthTec® per 1,000,000 gallons of water for preventive treatment of algae and nonpublic health bacteria. This will yield a concentration of 0.06 ppm metallic copper. Increase as necessary to achieve control but do not exceed a resulting copper concentration of 1.0 mg/L of metallic copper (background + applied copper) in the treated water.

If algae are present, treat at the rate of 3 quarts of EarthTec® per 250,000 gallons of water, or 3 gallons of EarthTec® per 1,000,000 gallons of water. This will yield a concentration of 0.18 ppm metallic copper.

For applications without fish or for wastewater lagoons apply at the rate of up to 1 quart of EarthTec per 15,000 gallons of water, or 1 gallon of EarthTec® per 60,000 gallons of water. This will yield a rate of 1.0 ppm metallic copper. Do not exceed a resulting concentration of 1.0 mg/L of metallic copper (background + applied copper) in the treated water.

Do not exceed 1 gallon of EarthTec® per 60,000 gallons of water (1.0 ppm metallic copper background + applied) under any circumstances for water destined for use as drinking water. EarthTec® may be poured into the water manually after calculating the volume of water to be treated and measuring the quantity EarthTec® necessary to attain a concentration of 0.06 ppm or by using an automated dispenser calibrated to release the required amount. For best results disperse EarthTec® evenly throughout the body of water on a sunny day when algae are near the surface. Do not apply copper sulfate to water with less than 50 ppm alkalinity.

To Control and Suppress Algae, Nonpublic Health Bacteria and Bacteria that Cause Taste and Odor Problems in Potable Water Supplies+; Canals; Aqueducts; and equipment/structures that deliver the treated water directly to publicly owned water treatment facilities to include pipes, intake structures, gatehouses, screens, pumping stations, weirs, and penstocks:

For flowing waters use a metering pump to apply a continuous dose so as to achieve a final dilution not to exceed 1.0 mg/L as copper (16.7 ppm as EarthTec®). Preferably start with 1 to 4 ppm EarthTec® (0.06 to 0.24 mg/L metallic copper) and increase only as necessary. A continuous maintenance dose of 0.6 to 2.0 ppm EarthTec® (yielding a metallic copper concentration of 36 to 120 ppb, or micrograms per liter) can be used to prevent further growth. Start treatment at the first sign of algae problems and stop treatment when algae no longer pose a nuisance.

To Control Algae or Nonpublic Health Bacteria and Bacteria That Cause Odor Problems in Open Channel Irrigation Conveyance Systems, Ditches and Canals: To prevent algae growth using a static application method, apply 1 gallon of EarthTec® to 1,000,000 gallons of water to yield a rate of 0.06 ppm metallic copper in the water. If algae are present, apply 16.6 gallons of EarthTec® to 1,000,000 gallons of water to yield 1.0 ppm metallic copper. To prevent algae growth using continuous flow systems, a metered flow rate of 1 milliliter per minute is added to a pumping flow of 267 gallons per minute to yield a rate of 0.06 ppm metallic copper. If algae are present, do not exceed the total dose of 1 gallon of EarthTec® in 60,000 gallons of water (1.0 ppm metallic copper). See Example Calculation table below for continuous flow rates.

To Control Algae or Nonpublic Health Bacteria and Bacteria That Cause Odor Problems in Sprinkler, Drip or Other Types of Irrigation Equipment: Agitation is not required. Do not mix with basic substances. EarthTec® must be applied continuously for the duration of the water application. To prevent growth of algae, nonpublic health bacteria, and bacteria that cause odor problems, treat at a rate of 1 gallon EarthTec® per 60,000 gallons of water to 1 gallon EarthTec® per 1,000,000 gallons of water. This will yield a rate of 1.0 ppm to 0.06 ppm metallic copper (see Example Calculation table below). If algae are visible, start by cleaning the pipes or lines and then applying 1 gallon of EarthTec® in 60,000 gallons of water (1.0 ppm metallic copper). See Example Calculation table below for continuous flow rates. Once the lines are cleaned, use the preventive dose described above.

EXAMPLE CALCULATION
IRRIGATION FLOW RATES
(0.06 ppm Cu)

Water Flow Rate gpm	Water Flow Rate cfm	Dosage Rate ppm Metallic Cu	EarthTec® fl oz/min	Feeder Pump Setting EarthTec® mL/min
3,000	400	0.06	0.4	11.3
6,000	800	0.06	0.8	22.6
9,000	1,200	0.06	1.1	34.0
12,000	1,600	0.06	1.5	45.3

IRRIGATION FLOW RATES
(1.0 ppm Cu)

Water Flow Rate gpm	Water Flow Rate cfm	Dosage Rate ppm Metallic Cu	EarthTec® fl oz/min	Feeder Pump Setting EarthTec® mL/min
3,000	400	1.0	6.4	188.7
6,000	800	1.0	12.8	377.5
9,000	1,200	1.0	19.1	566.2
12,000	1,600	1.0	25.5	755.0

APPLICATION AND HANDLING EQUIPMENT

Application, handling or storage equipment MUST consist of fiberglass, PVC, polypropylene, viton, corrosion resistant plastics or stainless steel. Never use mild steel, nylon, brass or copper around EarthTec®. Always rinse and clean equipment thoroughly each night with plenty of fresh, clean water.

PESTICIDE STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

PESTICIDE STORAGE: Store in a safe place away from pets and keep out of the reach of children. Store away from excessive heat. EarthTec® will freeze. Always store EarthTec® above 32 degrees F (Do Not Freeze). Freezing may cause product separation.

DO NOT FREEZE

Always keep container closed. Keep away from galvanized pipe, and any nylon storage or handling equipment.

DISPOSAL

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess EarthTec® mixture or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency, or the hazardous waste representative at the nearest EPA regional office for guidance. In the event of spill, neutralize with limestone or baking soda before disposal. May deteriorate concrete.

CONTAINER HANDLING

TANKER TRUCKS: Emptied container retains vapor and product residue. Observe all precautions stated on this label until the container is cleaned, reconditioned or destroyed. Prior to refilling, inspect carefully for damage such as cracks, punctures, abrasions, and worn-out threads and closures. Clean thoroughly before reuse for transportation of a material of different composition or before retiring this transport vehicle from service.

IMPORTANT
READ BEFORE USING
LIMITED WARRANTY AND LIMITATION OF REMEDIES

Read the entire Directions for Use, Limited Warranty and Limitation of Remedies (including limitations on liability) before using this product. If terms are not acceptable, return the unopened product container at once. By using this product, user or buyer accepts the following conditions, disclaimer of warranties and limitations of liability.

The Directions for Use of this product are believed to be adequate and must be followed carefully. However, it is impossible to eliminate all risks associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of Earth Science Laboratories, Inc. To the extent consistent with applicable law, all such risks shall be assumed by the user or buyer.

To the extent consistent with applicable law, seller warrants that the product conforms to the chemical description and is reasonably fit for the purpose stated on the label for use under normal conditions, but makes no other warranties of FITNESS OR MERCHANTABILITY expressed or implied, or any other warranty if the product is used contrary to the label instructions, or under conditions not foreseeable to the seller. To the extent consistent with applicable law, the seller shall not be liable for more than the cost of this product to the buyer and will in no event be liable for any consequential, special or indirect damages connected with the use or handling of this product. This product is offered and the buyer or user accepts it subject to the foregoing terms which may not be varied. Seller makes no warranty for product which has been frozen.

Always refer to the label on the product before using EarthTec or any other product.

ACCEPTED
August 16, 2018
New York State Department
of Environmental Conservation
Division of Materials Management
Pesticide Product Registration

Classified for
"RESTRICTED USE"
in New York State
under 6NYCRR Part 326

Doc id: 558617

Earth Science Laboratories, Inc.
113 S.E. 22nd St., Suite 1
Bentonville, Arkansas 72712

Phone 800.257.9283
Fax 479.271.7693
www.earthsciencelabs.com

FIFRA Section 2(ee) Recommendation

Product Bulletin Technical Information

EarthTec – Use of Reduced Rates for Control of Algae, Nonpublic Health Bacteria, and Bacteria That Cause Odor Problems in the State of New York

EPA Reg. Number: 64962-1

This recommendation is made as permitted under FIFRA section 2(ee) and has not been submitted to or approved by the federal EPA.

Pesticide applicator certification and a permit from the New York State Department of Environmental Conservation may be required for sale, possession, or use. Contact the Pesticide Control Specialist at your NYSDEC regional office prior to the proposed application for specific conditions or exemptions.

All applicable directions, restrictions, precautions and Conditions of Sale and Warranty on the EPA registered label are to be followed. Refer to the container label for additional instructions. Always read and follow label directions. Information contained in this Technical Information Bulletin is not intended to replace or amend any product labeling. Always read and follow all label directions when using any pesticide alone or in tank mix combinations. For use in controlling algae and cyanobacteria at all aquatic application sites do not exceed a copper concentration in water of 1.0 ppm of metallic copper concentration (background + applied).

The user must have this recommendation in their possession at the time of use.

Directions for Use – Open Waters

Apply a dose no more than 3 parts per million EarthTec (i.e., 3 gallons of EarthTec per million gallons of water treated, equivalent to 1 gallon of EarthTec per acre-foot), yielding a concentration of 0.18 mg/L (ppm) as metallic copper. Supplemental applications are permissible as long as no more than a cumulative total of 0.18 mg/L as copper is applied in any given 14-day period.

Dose (ppm by volume)	gals/MG*	gals/ac-ft	Cu^{2+} (mg/L)
0.5	0.5	0.15	0.030
1	1	0.3	0.060
2	2	0.7	0.120
3	3	1.0	0.180

*MG = million gallons

Directions for Use – Infrastructure and Flowing Waters

For protection of pipelines and other infrastructure by addition to flowing waters, use a metering pump to deliver a dose equivalent to 0.5 to 3.0 uL/L of product, equivalent to 0.03 to 0.18 mg/L as copper.

State Pollutant Discharge Elimination System (SPDES) DISCHARGE PERMIT

SIC Code:	**9511**	NAICS Code:	**924110**	SPDES Number:	**NY0300004**
Discharge Class (CL):	**01**			DEC Number:	**7-3150-00112/00004**
Toxic Class (TX):	**T**			Effective Date (EDP):	**8/1/2022**
Major-Sub Drainage Basin:	**Seneca Oneida - Skaneateles**			Expiration Date (ExDP):	**7/31/2027**
Water Index Number:	**Ont 66-12-29-P193**	Item No.:	**0707 - 0004**	Modification Dates (EDPM):	
Compact Area:	**IJC**				

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. '1251 et.seq.)

PERMITTEE NAME AND ADDRESS					
Name:	**City of Syracuse Dept. of Water**	Attention:	**Rich Abbott**		
Street:	**20 West Genesee Street**				
City:	**Skaneateles**	State:	**NY**	Zip Code:	**13152**
Email:	**rabbott@syrgov.net**	Phone:	**(315) 263-9254**		

is authorized to discharge EarthTec (EPA Reg. No. 64962-1) up to 2 times per year from the facility described below:

FACILITY NAME, ADDRESS, AND PRIMARY OUTFALL															
Name:	**Skaneateles Lake**														
Address / Location:												County:	**Onondaga**		
City:	**Skaneateles**						State:	**NY**			Zip Code:	**13152**			
Facility Location:		Latitude:	**42**	°	**56**	’	**41**	” N	& Longitude:	**76**	°	**25**	’	**46**	” W
Primary Outfall No.:	*	Latitude:		°		’		” N	& Longitude:		°		’		” W
Wastewater Description:	**Pesticide Labeled for Aquatic Use**	Receiving Water:	**Skaneateles Lake**				NAICS:	**924110**		Class:	**AA**				

in accordance with: effluent limitations; monitoring and reporting requirements; other provisions and conditions set forth in this permit; and 6 NYCRR Part 750-1 and 750-2.

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal not less than 180 days prior to the expiration date shown above.

DISTRIBUTION:
Regional Director
CO BWP - Permit Coordinator
CO BWC – SCIS
RWE
RPA
Regional Attorney
EPA Region II
NYSDOH / OCDOH

Permit Administrator:	Jonathan Stercho		
Address:	615 Erie Boulevard West, Syracuse New York 13204		
Signature:	Digitally signed by Jonathan Stercho Date: 2022.06.27 09:55:57 -04'00'	Date:	6/27/2022

Contents

DEFINITIONS FOR PERMIT LIMITS, LEVELS AND MONITORING TERMS

TERM	DEFINITION
7-Day Geo Mean	The highest allowable geometric mean of daily discharges over a calendar week.
7-Day Average	The average of all daily discharges for each 7-days in the monitoring period. The sample measurement is the highest of the 7-day averages calculated for the monitoring period.
12-Month Rolling Average (12 MRA)	The current monthly value of a parameter, plus the sum of the monthly values over the previous 11 months for that parameter, divided by 12.
30-Day Geometric Mean	The highest allowable geometric mean of daily discharges over a calendar month, calculated as the antilog of: the sum of the log of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.
Action Level	Action level means a monitoring requirement characterized by a numerical value that, when exceeded, triggers additional permittee actions and department review to determine if numerical effluent limitations should be imposed.
Compliance Level / Minimum Level	A compliance level is an effluent limitation. A compliance level is given when the water quality evaluation specifies a Water Quality Based Effluent Limit (WQBEL) below the Minimum Level. The compliance level shall be set at the Minimum Level (ML) for the most sensitive analytical method as given in 40 CFR Part 136, or otherwise accepted by the Department.
Daily Discharge	The discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants expressed in units of mass, the 'daily discharge' is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the 'daily discharge' is calculated as the average measurement of the pollutant over the day.
Daily Maximum	The highest allowable Daily Discharge.
Daily Minimum	The lowest allowable Daily Discharge.
Effective Date of Permit (EDP or EDPM)	The date this permit is in effect.
Effluent Limitations	Effluent limitation means any restriction on quantities, quality, rates and concentrations of chemical, physical, biological, and other constituents of effluents that are discharged into waters of the state.
Expiration Date of Permit (ExDP)	The date this permit is no longer in effect.
Instantaneous Maximum	The maximum level that may not be exceeded at any instant in time.
Instantaneous Minimum	The minimum level that must be maintained at all instants in time.
Monthly Average	The highest allowable average of daily discharges over a calendar month, calculated as the sum of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.
Outfall	The terminus of a sewer system, or the point of emergence of any waterborne sewage, industrial waste or other wastes or the effluent therefrom, into the waters of the State.
Range	The minimum and maximum instantaneous measurements for the reporting period must remain between the two values shown.
Receiving Water	The classified waters of the state to which the listed outfall discharges.
Sample Frequency / Sample Type / Units	See NYSDEC's "DMR Manual for Completing the Discharge Monitoring Report for the SPDES" for information on sample frequency, type and units.

PERMIT LIMITS, LEVELS AND MONITORING

OUTFALL No.	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
Treatment areas	Post-treatment	**Skaneateles Lake**	**8/1/2022**	**7/31/2027**

PARAMETER	ACTION LEVEL		UNITS	SAMPLE FREQUENCY	SAMPLE TYPE	FN
	Daily Avg.	Daily Max.				
Microcystin	NA	4.0	µg/L	Daily	Grab	1

FOOTNOTES:

1. See *Post-Treatment Requirements*.

SPECIAL CONDITIONS

Pre-treatment Requirements

1. A treatment may occur when necessary for the protection of the drinking water for the service area of the City of Syracuse Department of Water. Within one month of the effective date of this permit, the City shall develop, and submit to DEC, a Pesticide Management Plan, that will include at a minimum:
    - Identification of the indicators that will be used to determine when an EarthTec treatment will be performed
    - Identification of the procedures and analyses that will be performed prior to a decision to apply the pesticide EarthTec for treatment for protection of the water supply
    - Identification of Responsibilities for the application – including the person responsible for the pesticide application, as soon as determined
    - Control Measures - spill response and adverse incident procedures

    The Pesticide Management Plan must be submitted to and accepted by the DEC prior to an application of EarthTec being authorized.

Treatment Requirements

1. There shall only be up to two (2) EarthTec applications to the full treatment area in a calendar year. There must be at least 14 days between treatments in any treatment area.

2. All NYSDEC Pesticide Program rules and regulations must be followed.

3. Treatment with EarthTec must be in accordance with the product label instructions and requirements.

4. Treatment must begin closest to the shore and proceed outward in bands to allow fish to move into untreated areas.

5. EarthTec shall be applied at a rate between 0.15 – 0.3 gallons per acre foot (0.030 – 0.060 mg/L Cu^{2+}). The application area shall not exceed 570 acres as identified in the proposed application area in Figure 1.

6. Treatment shall immediately cease, and permittee shall notify NYSDEC if there is any visual evidence of biological impacts, including fish kills, during treatment.

7. Prior to EarthTec application, sampling shall be conducted in the proposed treatment area to confirm that the pH is greater than 6.5 and the alkalinity is greater than 50 mg/L. Water temperature shall be a minimum of 16 °C during application. During application for each day(s) of treatment, meter read in-situ sampling shall be conducted in a location within the treatment area that is representative of the treatment area water quality.

8. The treatment may only occur between 8 am - 5 pm.

Post-treatment Requirements

1. The City must collect and analyze a sample for microcystin concentration once within 24 hours following treatment within 100 feet of these beaches/resources: Skaneateles Country Club Bathing Area, Village of Skaneateles bathing area, Village of Skaneateles pier, and NYSDEC boat launch.
   Sampling must continue daily for 14 days following treatment, unless the microcystin concentration is less than 4 micrograms per liter (µg/L).

2. If the microcystin concentration is greater than or equal to 4 µg/L, the City will notify local and State Health Departments within 24 hours. The City will also notify the beach/resource manager within 24 hours for the purpose of coordinating postings as directed by the local or State Health Departments.

DISCHARGE NOTIFICATION REQUIREMENTS

1. 48 hours prior to an EarthTec application the permittee must notify the following parties of the date and location of an application: NYSDOH; Onondaga County Health Department; NYSDEC; Skaneateles Lake Association; elected officials of the Village of Skaneateles and the Town of Skaneateles; riparian owners and users within the treatment area; and, if the treatment will occur within 100 ft of any of these beaches/resources, the beach/resource manager of Skaneateles Country Club Bathing Area, Village of Skaneateles bathing area, Village of Skaneateles pier, or NYSDEC boat launch. Notification methods may include any of the following: email (Cornell Cooperative Extension & Soil and Water Conservation District of Onondaga County listserv), verbal communications, mailings and door-to-door handouts.
2. 48 hours prior to an EarthTec application, the permittee shall post use notification signs at the beach/pier locations identified in Figure 1 below. At a minimum, the signs shall include the following information:
    a. City of Syracuse, contact name and contact information, including phone and email address;
    b. Certified applicator name, business name and contact information
    c. Date of application;
    d. Name of pesticide; and
    e. Use restrictions, including prohibiting bathing and livestock watering for at least 24 hours following a treatment.

MONITORING LOCATIONS

The permittee shall take samples and measurements, to comply with the monitoring requirements specified in this permit, at the locations(s) specified below:

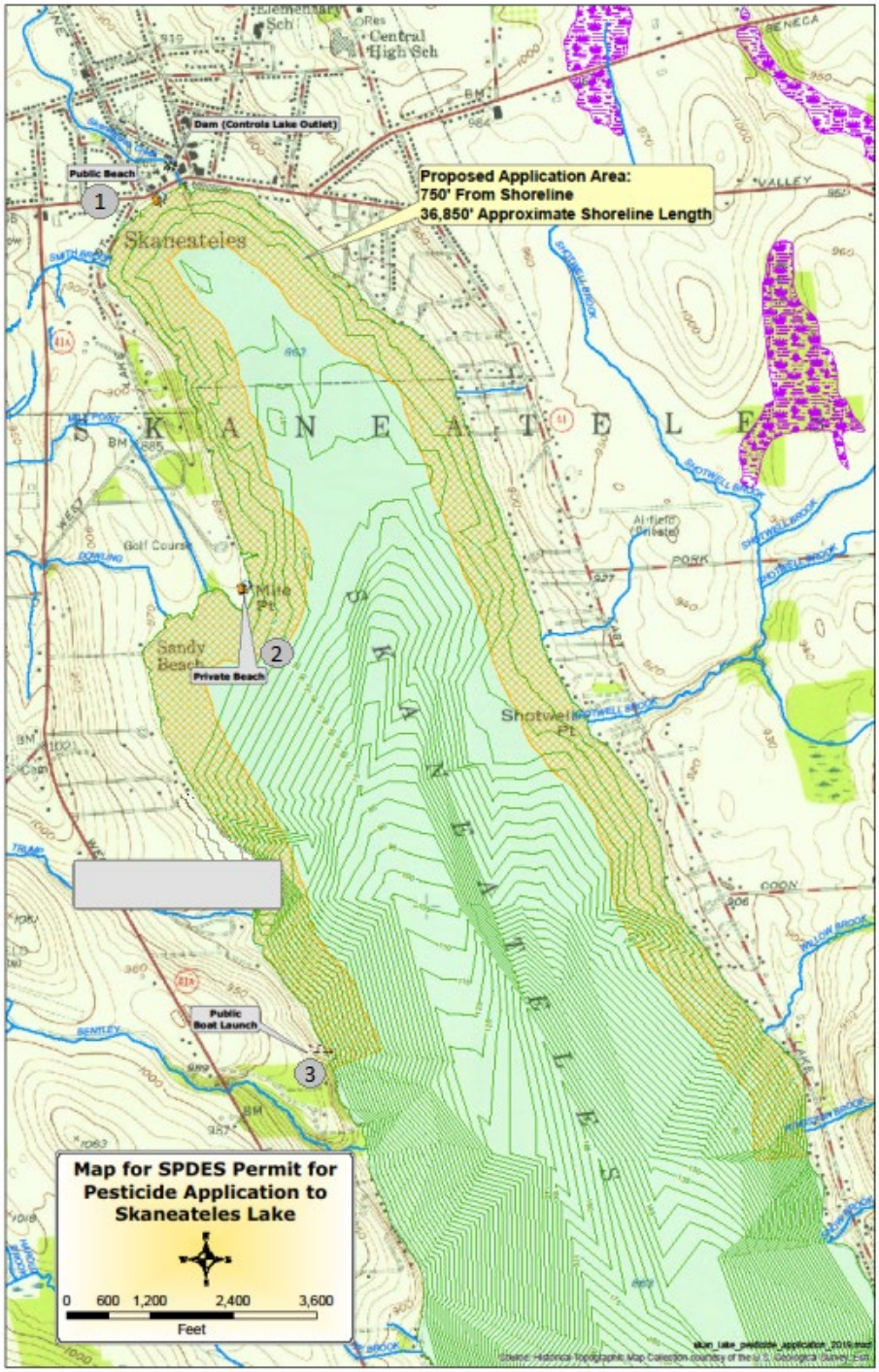


Figure 1. Treatment area and monitoring locations. The noted monitoring locations are the: 1) Village of Skaneateles Bathing Area and Skaneateles Pier; 2) Skaneateles Country Club Bathing Area; and 3) NYSDEC boat launch.

GENERAL REQUIREMENTS

A. The regulations in 6 NYCRR Part 750 are hereby incorporated by reference and the conditions are enforceable requirements under this permit. The permittee shall comply with all requirements set forth in this permit and with all the applicable requirements of 6 NYCRR Part 750 incorporated into this permit by reference, including but not limited to the regulations in paragraphs B through F as follows:

B. General Conditions

1.	Duty to comply	6 NYCRR 750-2.1(e) & 2.4
2.	Duty to reapply	6 NYCRR 750-1.16(a)
3.	Need to halt or reduce activity not a defense	6 NYCRR 750-2.1(g)
4.	Duty to mitigate	6 NYCRR 750-2.7(f)
5.	Permit actions	6 NYCRR 750-1.1(c), 1.18, 1.20 & 2.1(h)
6.	Property rights	6 NYCRR 750-2.2(b)
7.	Duty to provide information	6 NYCRR 750-2.1(i)
8.	Inspection and entry	6 NYCRR 750-2.1(a) & 2.3

C. Operation and Maintenance

1.	Proper Operation & Maintenance	6 NYCRR 750-2.8
2.	Bypass	6 NYCRR 750-1.2(a)(17), 2.8(b) & 2.7
3.	Upset	6 NYCRR 750-1.2(a)(94) & 2.8(c)

D. Monitoring and Records

1.	Monitoring and records	6 NYCRR 750-2.5(a)(2), 2.5(a)(6), 2.5(c)(1), 2.5(c)(2), & 2.5(d)
2.	Signatory requirements	6 NYCRR 750-1.8 & 2.5(b)

E. Reporting Requirements

1.	Reporting requirements for non-POTWs	6 NYCRR 750-2.5, 2.6, 2.7, &1.17
2.	Anticipated noncompliance	6 NYCRR 750-2.7(a)
3.	Transfers	6 NYCRR 750-1.17
4.	Monitoring reports	6 NYCRR 750-2.5(e)
5.	Compliance schedules	6 NYCRR 750-1.14(d)
6.	24-hour reporting	6 NYCRR 750-2.7(c) & (d)
7.	Other noncompliance	6 NYCRR 750-2.7(e)
8.	Other information	6 NYCRR 750-2.1(f)

F. SPDES Permit Program Fee

The permittee shall pay to the Department an annual SPDES permit program fee within 30 days of the date of the first invoice, unless otherwise directed by the Department, and shall comply with all applicable requirements of ECL 72-0602 and 6 NYCRR Parts 480, 481 and 485. Note that if there is inconsistency between the fees specified in ECL 72-0602 and 6 NYCRR Part 485, the ECL 72-0602 fees govern.

RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS

A. The monitoring information required by this permit shall be retained for a period of at least five years from the date of the sampling for subsequent inspection by the Department or its designated agent.

B. Annual SPDES Monitoring Reports: An annual report shall be submitted to the Department by February 1st each year. The report shall summarize information for January to December of the previous year and shall be submitted electronically, or in hardcopy format, utilizing the SPDES Annual Report Form available on the Department's website. The permittee shall submit a summary report of the data collected prior to, during, and after the EarthTec treatments.

Hard copy submission of the Annual Report shall be submitted to the Bureau of Water Permits and the Regional Water Engineer at the address below:

Department of Environmental Conservation
Regional Water Engineer, Region 7
615 Erie Boulevard West, Syracuse, New York, 13204-2400 Phone: (315)426-7500

Department of Environmental Conservation
Division of Water, Bureau of Water Permits
625 Broadway, 4th Floor
Albany, NY 12233

C. Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section 502 of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquiries regarding laboratory certification should be directed to the New York State Department of Health, Environmental Laboratory Accreditation Program.

D. Schedule of Additional Submittals:
The permittee shall submit the following information to the Regional Water Engineer and to the Bureau of Water Permits, unless otherwise instructed:

Outfall(s)	*SCHEDULE OF ADDITIONAL SUBMITTALS - Required Action*	Due Date
	PESTICIDE MANAGEMENT PLAN The permittee shall develop and submit a pesticide management plan as required in the *Special Conditions* of this permit. The pesticide management plan must be submitted to and accepted by the Department prior to an application of EarthTec being authorized.	9/1/2022

Unless noted otherwise, the above actions are one-time requirements. The permittee shall submit the results of the above actions to the satisfaction of the Department. When this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT", the permittee is not required to repeat the above submittal(s), unless noted otherwise. The above due dates are independent from the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT."

E. Monitoring and analysis shall be conducted using sufficiently sensitive test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

F. Calculations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

G. Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section 502 of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquiries regarding laboratory certification should be directed to the New York State Department of Health, Environmental Laboratory Accreditation Program.

SPDES Permit Fact Sheet

City of Syracuse Department of Water

Skaneateles Lake NY0300004

Contents

Summary of Permit Changes

A new State Pollutant Discharge Elimination System (SPDES) permit has been finalized for the City of Syracuse Water Department for:

- Application of the aquatic pesticide EarthTec in Skaneateles Lake to protect the City's water supply

After public notice, several minor non-substantive corrections have been made to the permit and factsheet.

This factsheet summarizes the information used to determine the effluent limitations and other conditions contained in the permit. General background information about the regulatory basis for the effluent limitations and other conditions contained in this permit are in the Appendix linked throughout this factsheet.

Administrative History

8/16/2020 The City of Syracuse Department of Water submitted a complete permit application.

4/24/2019 The City of Syracuse Department of Water submitted a request for a permit to Discharge a Pesticide Labeled for Aquatic Use

Please see the Notice of Complete Application, published in the Environmental Notice Bulletin and newspapers, for information on the public notice process.

Pesticide Treatment Information

Skaneateles Lake is a class AA waterbody that is used by the City of Syracuse as the primary source of their unfiltered water supply. Water is pumped from the lake to a reservoir where it is treated with Chlorine prior to distribution. The lake is a highly populated recreational lake with numerous riparian users. Harmful Algal Blooms (HABs) have been periodically detected at various locations within the lake.

Generally, aquatic pesticide applications in NYS are permitted under the SPDES Pesticide General Permit (GP-0-16-005), which works closely with other New York State Department of Environmental Conservation (NYSDEC) programs, such as the Aquatic Pesticide Program. The Aquatic Pesticide, Article 15, permitting process requires the applicant to certify that affected riparian owners and users have been notified of: the purpose of and the pesticide to be used for the proposed water treatment, any water use restrictions, and their right and how to file an objection; however, for Skaneateles Lake, the use of copper sulfate for algae control by a duly constituted water supply agency in its water supply is exempt from Article 15 permitting (see 6 NYCRR 327.1(c)).

Due to the potential for pesticide by-products resulting from application during a HAB, the proposed application of copper sulfate to Skaneateles Lake requires additional site-specific monitoring and operating conditions beyond those provided by the Pesticide General Permit (PGP) to avoid potential adverse environmental impacts. The PGP does not include public participation requirements prior to authorization, nor a vehicle to require post pesticide application monitoring to verify the pesticide application by-products are at safe levels to allow

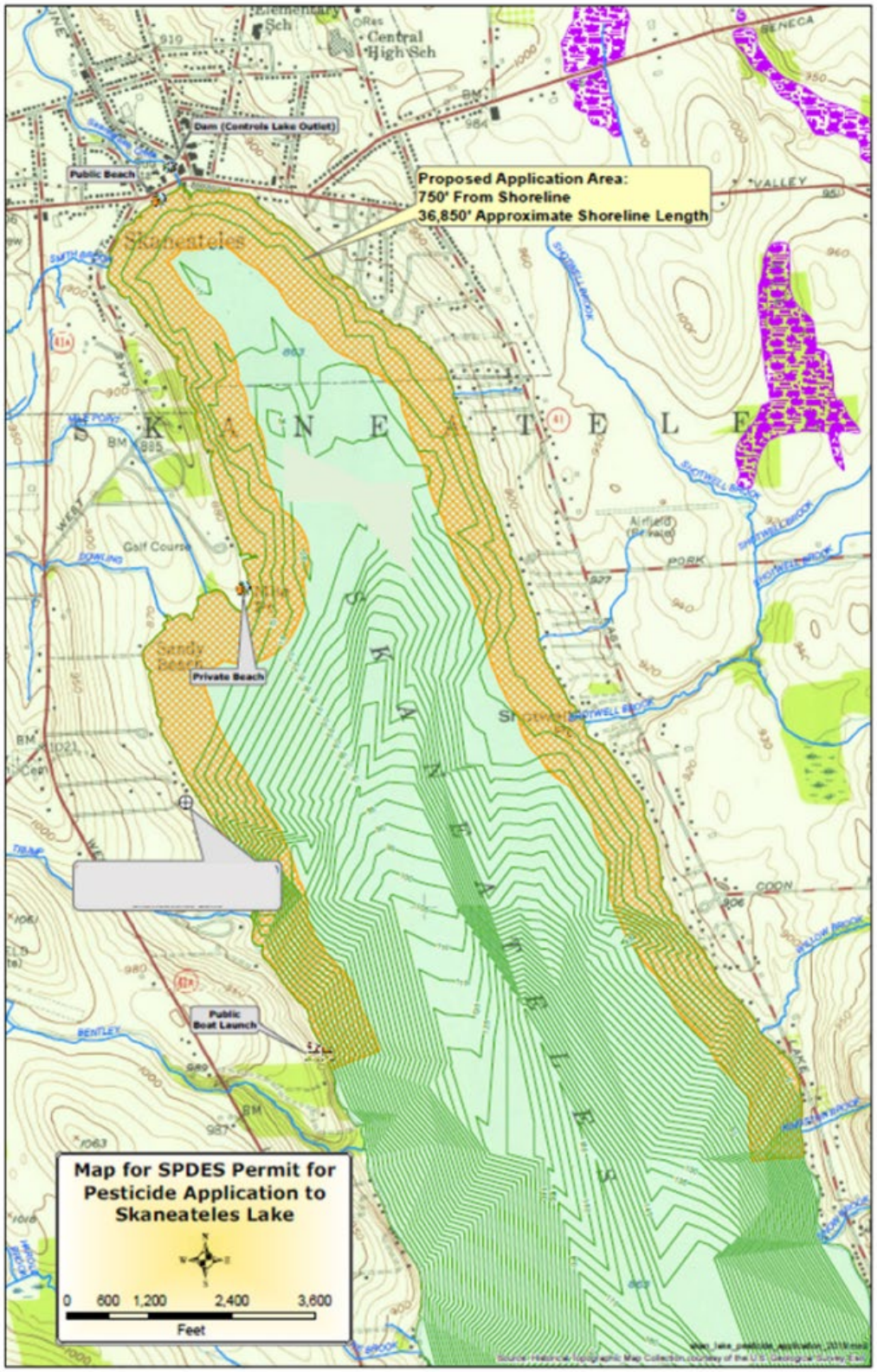
the water (Skaneateles Lake) to return to routine use. The cyanobacterial toxin microcystin is the application by-product of concern that NYSDEC Division of Water believes should have additional oversight and monitoring to ensure the safety of the public who recreate in the lake; therefore, an individual SPDES permit has been developed to provide additional site-specific control measures to ensure public safety.

This permit will authorize the use of the aquatic pesticide EarthTec in the North basin of Skaneateles Lake up to 2 times a year in an area of approximately 560 acres. EarthTec is an algaecide/bactericide, which uses copper sulfate as the active ingredient. The purpose of the proposed treatment is to protect the public water supply (Skaneateles Lake) from excessive algae growth, which may develop HABs. The use of the pesticide has the potential to release the toxin microcystin if present in the bacteria being treated.

The NYS Department of Health (DOH) guidance value for microcystin below which permitted bathing beaches may reopen, is 4.0 µg/L. In accordance with the narrative standard for protecting waters from deleterious substances that may contravene their best uses (6 NYCRR 703.2), this guidance value will ensure the recreational areas, identified below, that are located in the authorized treatment area will be protected. Monitoring of microcystin will be conducted following each EarthTec treatment at the Skaneateles Country Club bathing area, Village of Skaneateles bathing area and the Village of Skaneateles Pier and NYSDEC Boat Launch. If levels of microcystin exceed the 4.0 µg/L concentration, the permit requires the permittee to inform the Local Health Department with jurisdiction of the affected area and NYSDOH and conduct any follow up actions determined by either health department.

In accordance with the purpose of the DEC's public notification requirement (6 NYCRR Part 750-1.12) for point source discharges, the permit requires notification be made to NYSDEC, NYSDOH, the elected officials of the five townships in the watershed, and the riparian owners and users at least 48 hours prior to application to the treatment area.

Site Overview – Treatment Area (orange highlight)



Receiving Water Information

Skaneateles Lake is classified as a Class AA water.

Impaired Waterbody Information

The Skaneateles Lake segment (PWL No. 0707-0004) is not listed on the 2018 New York State Section 303(d) List of Impaired/TMDL Waters, and therefore, there are no applicable wasteload allocations (WLAs) for this discharge.

Mixing Zone and Critical Receiving Water Data

The City proposed to apply the pesticide EarthTec to Skaneateles Lake, which is a ponded waterbody. The proposed dosage rates of the active ingredient in EarthTec will be from 0.03 ppm Cu - 0.06 ppm Cu, which is in accordance with the NYSDEC-approved EarthTec label requirements.

Permit Requirements

The technology based effluent limitations (TBELs), water quality-based effluent limitations (WQBELs), existing effluent quality and a discussion of the selected effluent limitation for each pollutant present in the discharge are provided in the Action Level Table.

Whole Effluent Toxicity (WET) Testing

None of the seven criteria that are indicative of potential toxicity and listed in the Appendix to this factsheet, are applicable to this facility; therefore, WET testing is not included in the permit.

Antidegradation

The permit contains effluent limitations which ensure that the designated best use of the receiving waters will be maintained. Please see the Environmental Notice Bulletin for information on the State Environmental Quality Review (SEQR)[1] determination. Appendix Link

Mercury[2]

There are no mercury effluent limitations applicable to this pesticide application.

[1] As prescribed by 6 NYCRR Part 617
[2] In accordance with NYSDEC's Mercury Multiple Discharge Variance (MDV) in TOGS 1.3.10.

Special Conditions

The permit contains notifications that must occur prior to the pesticide treatment; the requirements to adhere to during treatment; post treatment monitoring requirements; and possible further action, if, and as directed, by the NYSDOH.

After public notice, the permit conditions were updated. The *Pre-treatment Requirements* for the Pesticide Management Plan was updated to require submission to and review by the DEC prior to pesticide use. The *Treatment Requirements* were updated to reflect the 6 NYCRR Part 327.6 requirements for copper sulfate. The treatment application rate of gallons per acre foot was also updated to better reflect the FIFRA Section 2(ee) Recommendation for this product. Copper sulfate pesticide treatments conducted by a recognized water supply agency in its water supply are exempt from the 6 NYCRR Part 327 aquatic vegetation control regulation requirements; however, the DEC is recognizing the required water use restrictions of 6 NYCRR Section 327.6 regarding the use of copper sulfate.

Additionally, after public notice, the *Discharge Notification Requirements* section of the permit was updated to include pesticide application signage requirements identified in Figure 1 in the permit.

RECEIVING WATER SUMMARY TABLE

Treatment Area	Latitude	Longitude	Receiving Water Name	Water Class	Water Index No. / Priority Waterbody Listing (PWL) No.	Major / Sub Basin	Hardness (mg/l)[1]	1Q10 (MGD)	7Q10 (MGD)	30Q10 (MGD)	Critical Effluent Flow (MGD)	Dilution Ratio		
												A(A)	A(C)	HEW
North end of the lake	42° 51' 37.548" N	76° 21' 50.076" W	Skaneateles Lake	AA	Ont 66-12-29-P193 PWL: 0707-0004	07/07	125	-	-	-	-	-	-	-

ACTION LEVEL TABLE

Outfall Treatment Area

Treatment Area		**Description of Wastewater:** N/A												
		Type of Treatment: Pesticide Application												
Effluent Parameter	Units	Averaging Period	Existing Discharge Data			TBELs		Water Quality Data & WQBELs						ML	Basis for Permit Requirement
			Permit Limit	Existing Effluent Quality[3]	# of Data Points Detects / Non-Detects	Limit	Basis	Ambient Bkgd. Conc.	Projected Instream Conc.	WQ Std. or GV	WQ Type	Calc. WQBEL	Basis for WQBEL		
Microcystin Post- treatment	µg/L		4.0 Action Level												Action Level
	Action level of 4 µg/L based upon the NYSDOH Guidance Value for microcystin for contact recreation. If this level is exceeded, the City of Syracuse is required to notify the local NYSDOH districts such that any further action, as directed by the NYSDOH, can be performed.														

[1]Ambient hardness data obtained from 1984 WQSN Hardness data memo

Appendix: Regulatory and Technical Basis of Permit Authorizations

The information presented in the Appendix is meant to supplement the factsheet for multiple types of permits and may not be applicable to this specific permit.

Regulatory References

The requirements included in SPDES permits are based on both federal and state laws, regulations, policies, and guidance.

- Clean Water Act (CWA) 33 section USC 1251 to 1387
- Environmental Conservation Law (ECL) Articles 17 and 70
- Federal Regulations
  - 40 CFR, Chapter I, subchapters D, N, and O
- State environmental regulations
  - 6 NYCRR Part 621
  - 6 NYCRR Part 750
  - 6 NYCRR Parts 700 - 704 – Best use and other requirements applicable to water classes
  - 6 NYCRR Parts 800 – 941 - Classification of individual surface waters
- NYSDEC water program policy, often referred to as Technical and Operational Guidance Series memos (TOGS)
- USEPA Office of Water Technical Support Document for Water Quality-based Toxics Control, March 1991, Appendix E

The following is a quick guide to the references used within the factsheet:

SPDES Permit Requirements	Regulatory Reference
Anti-backsliding	6 NYCRR 750-1.10(c)
Best Management Practices (BMPS) for CSOs	6 NYCRR 750-2.8(a)(2)
Environmental Benefits Permit Strategy (EBPS)	6 NYCRR 750-1.18, NYS ECL 17-0817(4), TOGS 1.2.2 (revised January 25,2012)
Exceptions for Type I SSO Outfalls (bypass)	6 NYCRR 750-2.8(b)(2), 40 CFR 122.41
Mercury Multiple Discharge Variance	Division of Water Program Policy 1.3.10 (TOGS 1.3.10)
Mixing Zone and Critical Water Information	TOGS 1.3.1 & Amendments
PCB Minimization Program	40 CFR Part 132 Appendix F Procedure 8, 6 NYCRR 750-1.13(a) and 750-1.14(f), and TOGS 1.2.1
Pollutant Minimization Program (PMP)	6 NYCRR 750-1.13(a), 750-1.14(f), TOGS 1.2.1
Schedules of Compliance	6 NYCRR 750-1.14
Sewage Pollution Right to Know (SPRTK)	NYS ECL 17-0826-a, 6 NYCRR 750-2.7
State Administrative Procedure Act (SAPA)	State Administrative Procedure Act Section 401(2), 6 NYCRR 621.11(l)
State Environmental Quality Review (SEQR)	6 NYCRR Part 617
USEPA Effluent Limitation Guidelines (ELGs)	40 CFR Parts 405-471
USEPA National CSO Policy	33 USC Section 1342(q)
Whole Effluent Toxicity (WET) Testing	TOGS 1.3.2
General Provisions of a SPDES Permit Department Request for Additional Information	NYCRR 750-2.1(i)

The provisions of the permit are based largely upon 40 CFR 122 subpart C and 6 NYCRR Part 750 and include monitoring, recording, reporting, and compliance requirements, as well as general conditions applicable to all SPDES permits.

Outfall and Receiving Water Information

Impaired Waters

The NYS 303(d) List of Impaired/TMDL Waters (http://www.dec.ny.gov/chemical/31290.html) identifies waters where specific designated uses are not fully supported and for which the state must consider the development of a TMDL or other strategy to reduce the input of the specific pollutant(s) that restrict waterbody uses, in order to restore and protect such uses. SPDES permits must include effluent limitations necessary to implement a WLA of an EPA-approved TMDL (6 NYCRR 750-1.11(a)(5)(ii)), if applicable. In accordance with 6 NYCRR 750-1.13(a), permittees discharging to waters which are on the list but do not yet have a TMDL developed may be required to perform additional monitoring for the parameters causing the impairment. Accurate monitoring data is needed for the development of the TMDL, and to allow the Department to accurately determine the existing capabilities of the wastewater treatment plant. Accurate monitoring data will also assure that wasteload allocations (WLAs) are allocated equitably.

Permit Requirements

Basis for Effluent Limitations

Sections 101, 301, 304, 308, 401, 402, and 405 of the CWA and Titles 5, 7, and 8 of Article 17 ECL, as well as their implementing federal and state regulations, and related guidance, provide the basis for the effluent limitations and other conditions in the permit.

When conducting a full technical review of an existing permit, the previous permit limitations form the basis for the next permit. Existing effluent quality is evaluated against the existing permit limitations to determine if these should be continued, revised, or deleted. Generally, existing limitations are continued unless there are changed conditions at the facility, the facility demonstrates an ability to meet more stringent limitations, and/or in response to updated regulatory requirements. Pollutant monitoring data is also reviewed to determine the presence of additional contaminants that should be included in the permit based on a reasonable potential analysis to cause or contribute to a water quality standards violation.

Anti-backsliding

Anti-backsliding requirements are specified in the CWA sections 402(o) and 303(d)(4), ECL 17-0809, and regulations at 40 CFR 122.44(*l*) and 6 NYCRR 750-1.10(c) and (d). Generally, the relaxation of effluent limitations in permits is prohibited unless one of the specified exceptions applies, which will be cited on a case-by-case basis in this factsheet. Consistent with current case law[4] and USEPA interpretation[5] anti-backsliding requirements do not apply should a revision to the final effluent limitation take effect before the scheduled date of compliance for that final effluent limitation.

Effluent Limitations

In developing a permit, the Department determines the technology-based effluent limitations (TBELs) and then evaluates the water quality expected to result from technology controls to determine if any exceedances of water quality criteria in the receiving water might result. If there is a reasonable potential for exceedances of water quality criteria to occur, water quality-based effluent limitations (WQBELs) are developed. A WQBEL is designed to ensure that the water quality standards of receiving waters are met. In general, the CWA requires that the effluent limitations for a particular pollutant are the more stringent of either the TBEL or WQBEL.

Technology-based Effluent Limitations (TBELs)

CWA sections 301(b)(1)(B) and 304(d)(1), 40 CFR 133.102, ECL section 17-0509, and 6 NYCRR 750-1.11 require technology-based controls, known as secondary treatment. These and other requirements

[4] American Iron and Steel Institute v. Environmental Protection Agency, 115 F.3d 979, 993 n.6 (D.C. Cir. 1997)
[5] U.S. EPA, Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; 65 Fed. Reg. 31682, 31704 (May 18, 2000); Proposed Water Quality Guidance for the Great Lakes System, 58 Fed. Reg. 20802, 20837 & 20981 (April 16, 1993)

are summarized in TOGS 1.3.3. Equivalent secondary treatment, as defined in 40 CFR 133.105, allow for effluent limitations of the more stringent of the consistently achievable concentrations or monthly/weekly averages of 45/65 mg/l, and the minimum monthly average of at least 65% removal. Consistently achievable concentrations are defined in 40 CFR 133.101(f) as the 95th percentile value for the 30-day (monthly) average effluent quality achieved by the facility in a period of two years. The achievable 7-day (weekly) average value is equal to 1.5 times the 30-day average value calculated above. Equivalent secondary treatment applies to those facilities where the principal treatment process is either a trickling filter or a waste stabilization pond; the treatment works provides significant biological treatment of municipal wastewater; and, the effluent concentrations consistently achievable through proper operation and maintenance of the facility cannot meet traditional secondary treatment requirements.

Other Technology Based Effluent Limitations:
There are no federal technology-based standards for toxic pollutants from POTWs. For each toxic parameter present in the discharge a Reasonable Potential Analysis is conducted. This may be a statistical analysis of existing data in accordance with TOGS 1.2.1, or an assessment of the technology employed at the facility and selection of the appropriate limitation from TOGS 1.2.1 Attachment C. Where the TBEL is more stringent than the WQBEL, the TBEL is applied as an action level in accordance with TOGS 1.3.3.

Minimum Level of Detection

Pursuant to 40 CFR 122.44(i)(1), SPDES permits must contain monitoring requirements using sufficiently sensitive test procedures approved under 40 CFR Part 136. A method is “sufficiently sensitive” when the method’s minimum level (ML) is at or below the level of the effluent limitation established in the permit for the measured pollutant parameter; or the lowest ML of the analytical methods approved under 40 CFR Part 136. The ML represents the lowest level that can be measured within specified limitations of precision and accuracy during routine laboratory operations on most effluent matrices. When establishing effluent limitations for a specific parameter (based on technology or water quality requirements), it is possible that the calculated limitation will fall below the ML established by the approved analytical method(s). In these instances, the calculated limitation is included in the permit with a compliance level set equal to the ML of the most sensitive method.

Monitoring Requirements

CWA section 308, 40 CFR 122.44(i), and 6 NYCRR 750-1.13 require that monitoring be included in permits to determine compliance with effluent limitations. Additional effluent monitoring may also be required to gather data to determine if effluent limitations may be required. The permittee is responsible for conducting the monitoring and reporting results on Discharge Monitoring Reports (DMRs). The permit contains the monitoring requirements for the facility. Monitoring frequency is based on the minimum sampling necessary to adequately monitor the facility’s performance and characterize the nature of the discharge of the monitored flow or pollutant. Variable effluent flows and pollutant levels may be required to be monitored at more frequent intervals than relatively constant effluent flow and pollutant levels (6 NYCRR 750-1.13). For industrial facilities, sampling frequency is based on guidance provided in TOGS 1.2.1. For municipal facilities, sampling frequency is based on guidance provided in TOGS 1.3.3.