



Department of
Environmental
Conservation

Cayuga Lake Water Quality, Harmful Algal Blooms, and Watershed Progress

Tony Prestigiacomo, NYSDEC Division of Water, Finger
Lakes Watershed Program
June 20, 2024

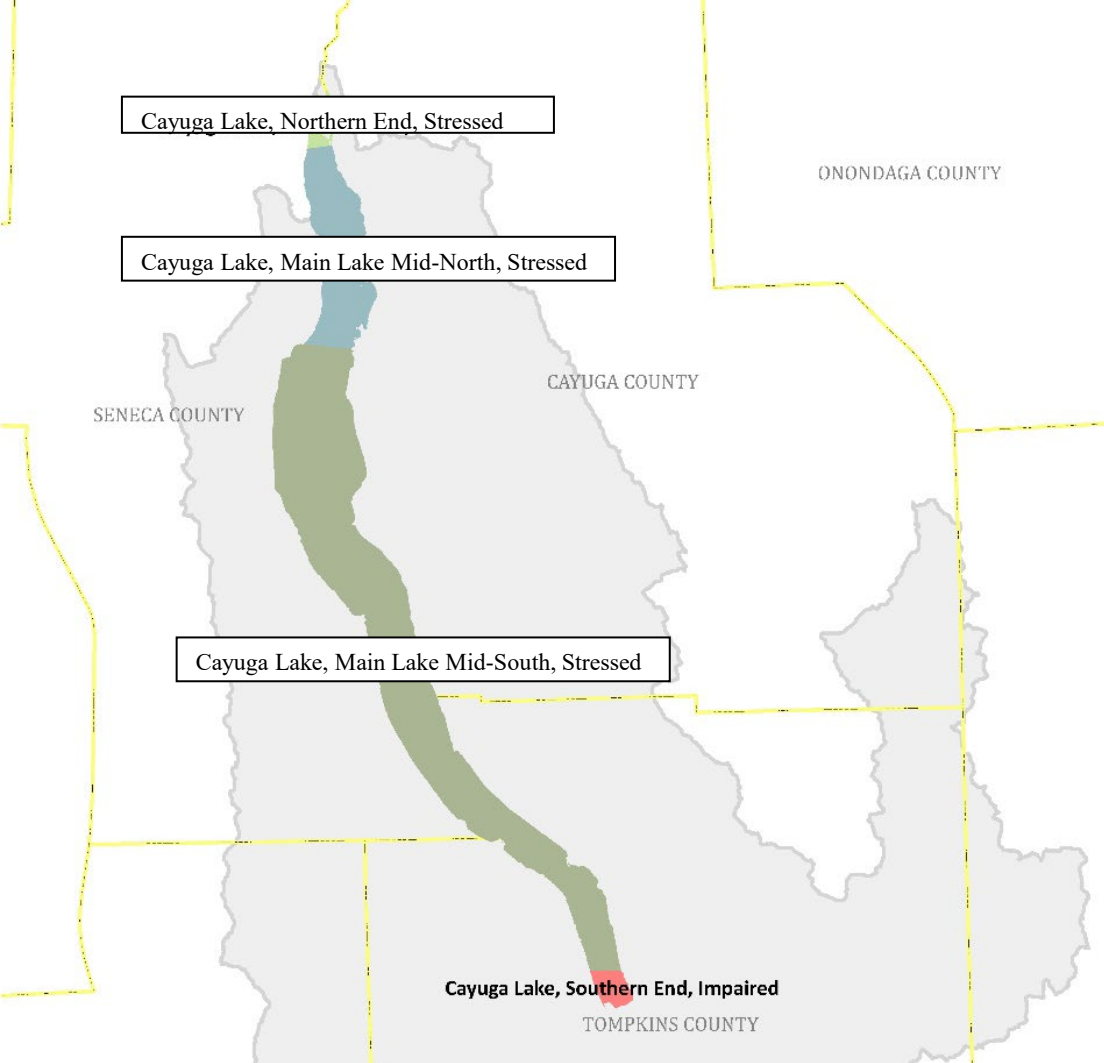


Who Am I?

- Grew up in Dolgeville, NY
- College in Herkimer, NY; College in Syracuse, NY
- Work in Syracuse, NY; Albany, NY
- Live in Cortland, NY

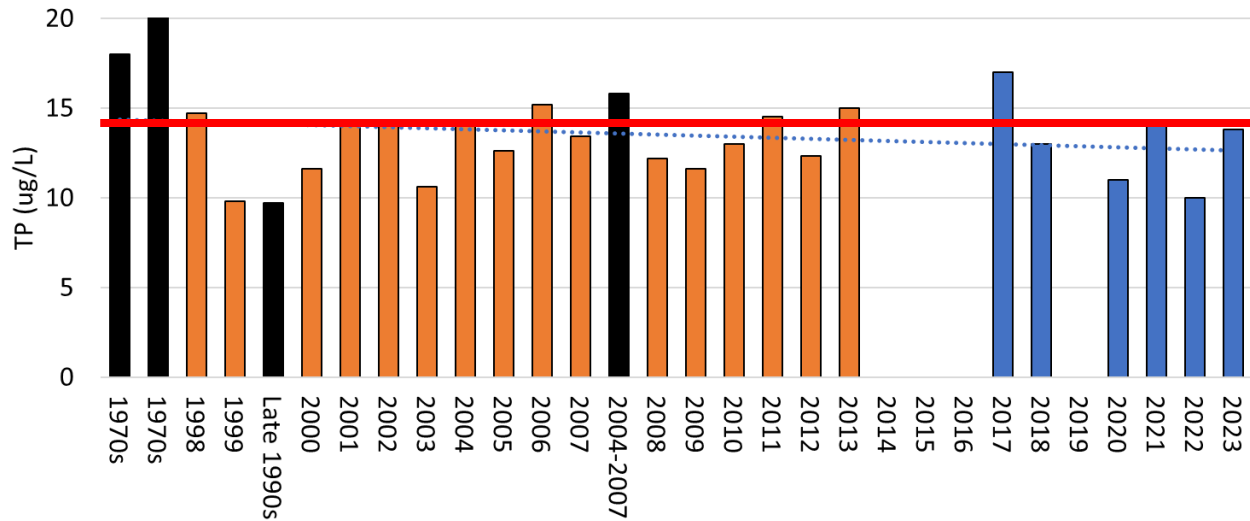


Water Quality



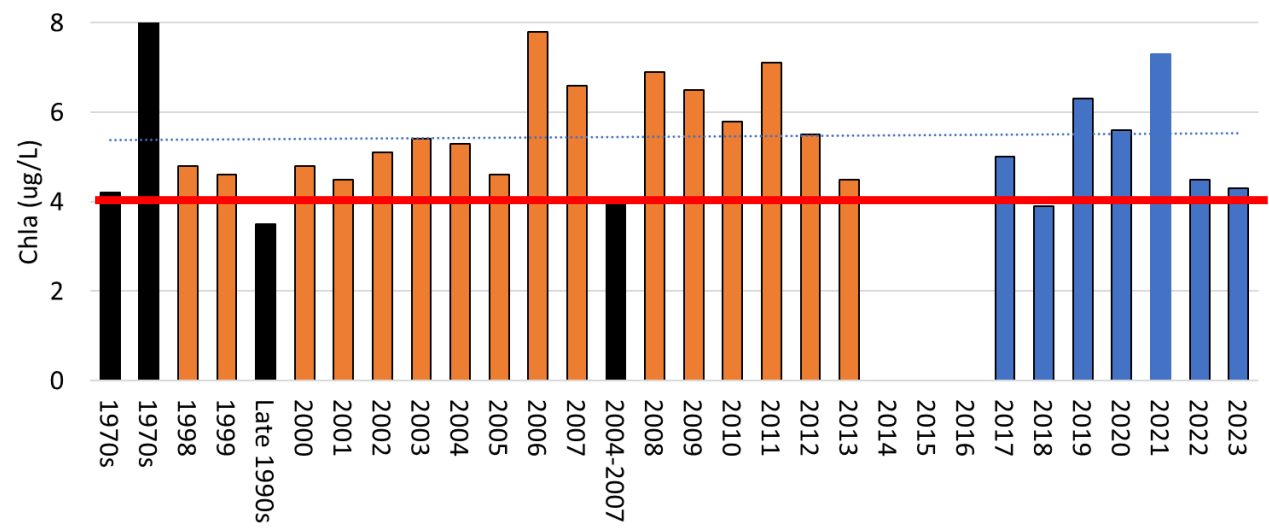
The Main Lake, Mid-South AA and Main Lake, Mid-North Class A segments make up 96% of the Cayuga Lake's surface area.





- TP – slight decline since the 1970s
- ~ unchanged since 1990's

- Chl-a – slight increase since the 1970s
- slight increase since 1990's
- Consistent with statewide patterns



← → ↻ 🏠 <https://nysdec.maps.arcgis.com>

📱 Apps 🌐 Google 🗺️ Google Maps 📄 Google Scholar

← → ↻ 🏠 <https://experience.arcgis.com/experience>

📱 Apps 🌐 Google 🗺️ Google Maps 📄 Google Scholar 🌐 New York State Dep...

← → ↻ 🏠 <https://gisservices.dec.ny.gov/gis/dil/>

📱 Apps 🌐 Google 🗺️ Google Maps 📄 Google Scholar 🌐 New York State Dep... 🌐 Supervisor Resource... 🌐 NYHABS Portal 🌐 NYHABS 🌐 Workspace

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DECinfo Locator

Search

Tools

DEC Information Layers

Environmental Quality Outdoor Activity

Permits and Registrations

- Waste Tire Handling and Recovery Facilities
- Wastewater Facilities (SPDES)
- Combined Sewer Overflow (CSO) Outfalls

Environmental Cleanup

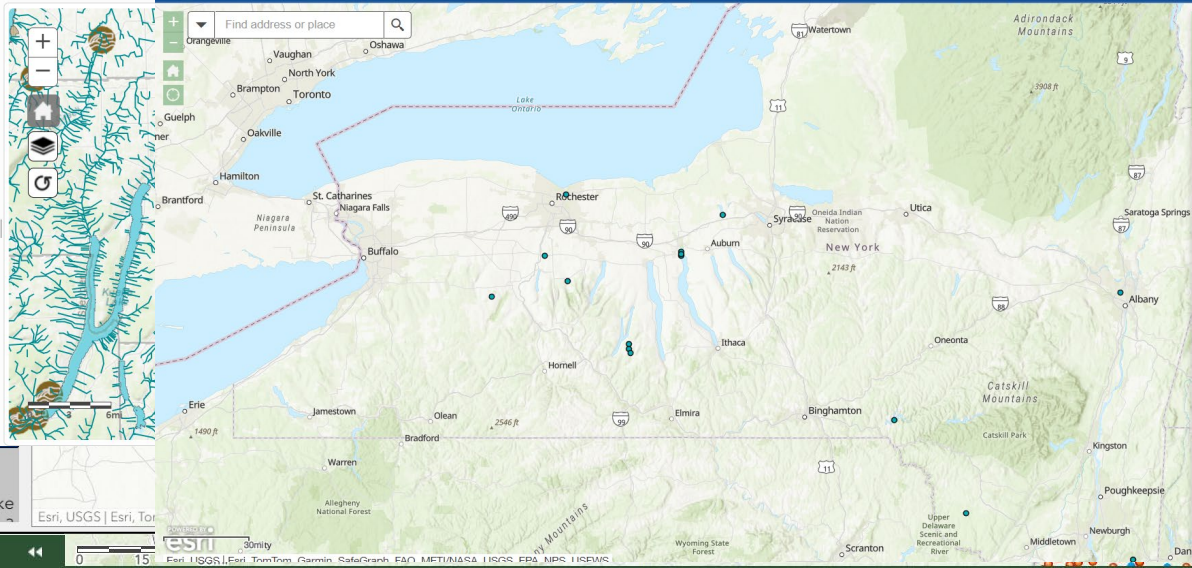
Environmental Monitoring

Public Involvement

Environmentally Sensitive Areas

Legal Information

Reference Layers



About NYHABS

Press the ... icon above to minimize this info tab.

[Return to DEC HABS homepage.](#)

NEW YORK
STATE OF OPPORTUNITY
Department of Environmental Conservation

Click on any point to view report data.

Use the arrow icon at the bottom of your screen to view a table of reports.

In this map:

- Current HAB reports within the last two weeks, and may not reflect current conditions.
- Archived HAB reports more than two weeks ago, but were reported this year.

HABs may be present in other places, or conditions may have changed since

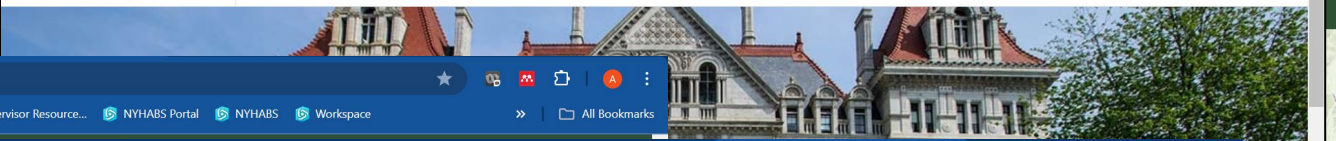
What is CSLAP?

The Citizens Statewide Lake Assessment Program (CSLAP) is a

← → ↻ 🏠 <https://www.ny.gov/programs/open-ny>

📱 Apps 🌐 Google 🗺️ Google Maps 📄 Google Scholar 🌐 New York State Dep... 🌐 Supervisor Resource... 🌐 NYHABS Portal 🌐 NYHABS 🌐 Workspace

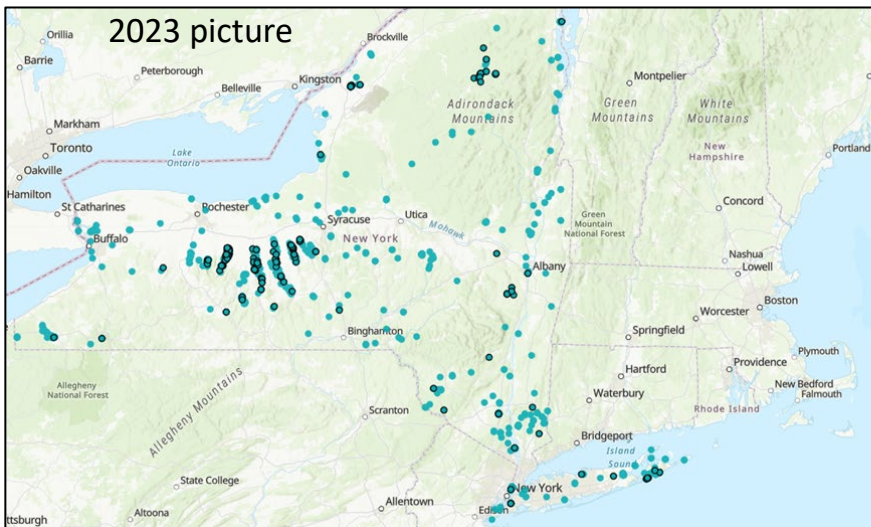
Services News Government



← → ↻ 🏠 <https://nysdec.maps.arcgis.com/apps/webappviewer/index.html?id=ae91142c812a4ab997ba739ed9723e6e>

📱 Apps 🌐 Google 🗺️ Google Maps 📄 Google Scholar 🌐 New York State Dep... 🌐 Supervisor Resource... 🌐 NYHABS Portal 🌐 NYHABS 🌐 Workspace

NY HABS Reports - NYHABS



Orange highlighted Finger Lakes have summer TP < 10 $\mu\text{g/L}$

* Hemlock and Canadice watershed are ~ 73 % forested and water

Finger Lake	'23	'22	'21	'20	'19	'18	'17
Conesus	X	X	X	X	X	X	X
Hemlock*	X	X	X	X	X	X	X
Canadice*	X	X			X		X
Honeoye	X	X	X	X	X	X	X
Canandaigua	X	X	X	X	X	X	X
Keuka	X	X	X	X	X	X	X
Seneca	X	X	X	X	X	X	X
Cayuga	X	X	X	X	X	X	X
Owasco	X	X	X	X	X	X	X
Skaneateles	X	X	X	X	X	X	X
Otisco	X	X	X	X	X	X	X

What is DEC Doing About HABs

NYS Coordinated Efforts and Reporting

- Interagency collaboration: DEC, OPRHP, DOH
 - DEC coordinates reporting; hosts NYHABS
 - Health concerns & drinking water treatment overseen by local operators/DOH
 - Regulated swimming areas (beaches) have a protective response protocol based on visual observations
- The New York Harmful Algal Bloom System (NYHABS) was established in 2019

Address: ...

North York

Toronto

St. Catharines

Rochester

Auburn

New York

Oneonta

Horrell

Jamestown

Olean

Warren

Allegany National Forest

Adirondack

3908 ft

2143 ft

Catskill Mountains

Binghamton

Kingston

Upper Delaware Scenic and Recreational River

Scranton

Poughkeepsie

Newburgh

Middletown

Dan

Department of Environmental Conservation

NEW YORK STATE OF OPPORTUNITY

About NYHABS

Press the ... icon above to minimize this tab.

Return to [DEC HABS homepage](#).

Click on any point to view report data. Use the arrow icon at the bottom of screen to view a table of reports.

In this map:

Current HAB reports within the ... weeks, and may not reflect current conditions.

Archived HAB reports more than two weeks old are reported to ...

HABs may be present in other places or conditions may have changed since ...

NYSDEC's Holistic Approach to HABs

1. Monitoring and Watershed Management

- Monitoring, Clean Water Planning and pollutant reduction strategies to address long-term controllable causes

2. Funding projects to reduce occurrence of HABs – WQIP, NPG

- To date: **over \$428 million** to nutrient reduction projects

3. Research HABs and their causes

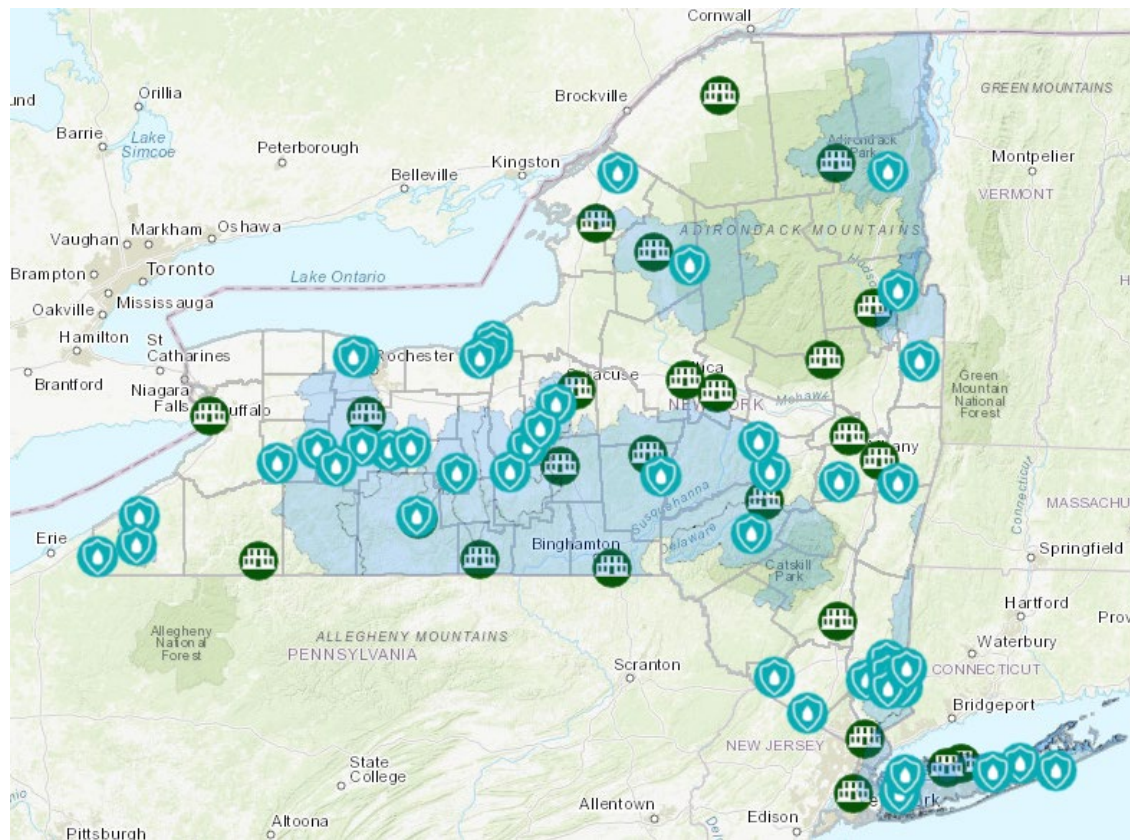
- Focus on prevention, mitigation, monitoring, and modeling to understand causes - NYSDEC HAB Research Guide
- To date: **over \$14 million** for research

4. In-Waterbody Mitigation

- Development, implementation, and evaluation to help control bloom size and formation

Monitoring and Watershed Management

Clean Water Plans in New York State

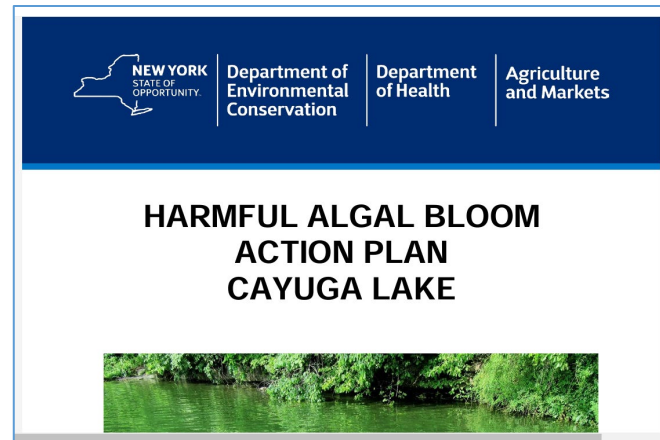


Department of
Environmental
Conservation

Cayuga's Clean Water Plans

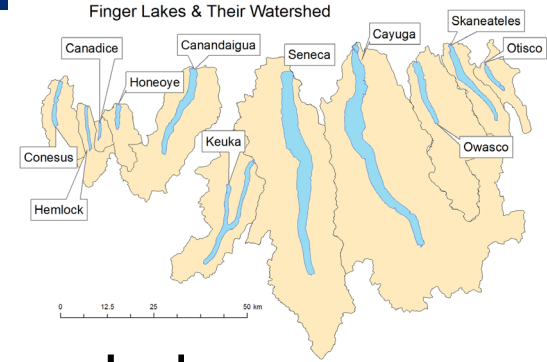
Existing and On-going Planning Documents

1. HAB Action Plan (DEC, Cayuga)
 - complete/implementation ongoing
2. TMDL (DEC)
 - drafted/**implementation ongoing**
3. DWSP2s (DEC, Cayuga)
 - several in development
4. Cayuga Lake WRPP (DOS, Cayuga)
 - complete/implementation ongoing
5. SWCD Strategic Plans (SWCDs)
 - complete/implementation ongoing



Implementation/Capacity Building in the Finger Lakes

- DEC is working with GLP to increase acquisition of federal funding (GLRI) in Finger Lakes
- Working to secure *supplemental* funding to build upon existing programs
- DEC and AGM working closely with SWCDs to build capacity for BMP implementation within the Finger Lakes region

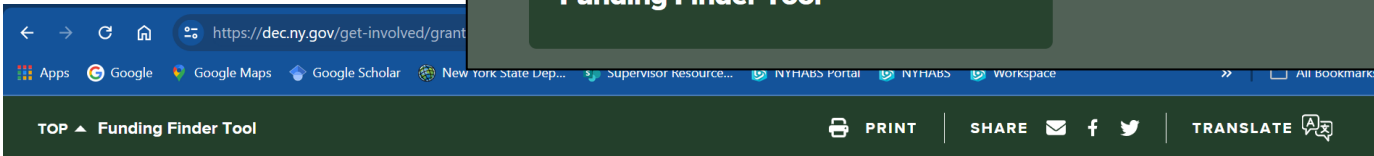




Department of Environmental Conservation

Funding Finder Tool

Grant Funding



TOP Funding Finder Tool

PRINT | SHARE | TRANSLATE

Grant Applications

[Funding Finder Tool](#)

[Lands And Forests Grantee Resources](#)

[Non-Agricultural Nonpoint Source Planning And MS4 Mapping Grant](#)

[Water Quality Improvement Project \(WQIP\) Program](#)

Are you looking for funding? Our new tool can help you!

The Funding Finder is designed to simplify the process of finding grant opportunities. The tool enables grant seekers to filter grant opportunities based on criteria that meets their specific needs.

After discussions with different stakeholders, it was clear there is a barrier to applicants being aware of grant opportunities. The Funding Finder is part of the solution and encompasses a wide variety of federal, state, and local funding and will be updated periodically. DEC grants featured in the tool include: water protection, wildlife protection, land and forest protection, climate change and environmental justice grants. Find more information on [DEC specific grants](#).

To download the Funding Finder and associated User Guide, click the links below.

- [Funding Finder](#) (Note: Preferred browsers for this tool are Chrome and Safari. If you are using Microsoft Edge or Firefox, allow pop-ups and click "download file.")
- [Funding Finder User Guide](#) - Step-by-step instruction packet with illustration for additional guidance.

How to use the Funding Finder

This simple tool allows grant seekers to filter through grants based on categories including: eligible applicants, project type, project phase, and regional coverage. The results of your search within the tool will provide you with a direct link to the RFP of the grant(s) that best meet your search result. For additional information contact the grant agent directly with more specific

Non-agricultural Nonpoint Source Planning and MS4 Mapping Grant (NPG)

Types of Projects

- Planning/design for future implementation projects
- Mapping MS4 systems



Priorities

- Initial planning of non-agricultural nonpoint source, climate resiliency and dam safety projects
- Regulated MS4 mapping

Available funding: Up to \$3 million

- \$50,000 - \$400,000 per project (dependent on project type)

Match requirements:

- 10 % of requested funding

Eligibility: (dependent on project type)

- Municipalities, including Indian Nations (ECL §56-0101)
- Soil and water conservation districts

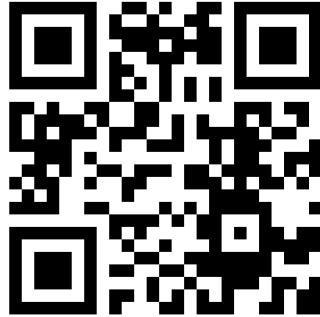


Department of
Environmental
Conservation

Water Quality Improvement Project Program (WQIP)

Types of Projects

- Implementation



Priorities

- Improve water quality or habitat
- Promote flood risk reduction restoration, and enhanced flood and climate resiliency
- Protect a drinking water source

Available funding: At least \$215 million

- \$100,000 - \$15 million per project (dependent on project type)

Match requirements:

- 25 % of requested funds/award

Eligibility: (dependent on project type)

- Municipalities, including Indian Nations
- Soil and water conservation districts
- Not-for-profit corporations



Research

Cyanobacteria and Low Nutrient Lakes

- HABs have been increasingly reported in low- and moderate- nutrient lakes
- 2018 NYSDEC HABs Action Plans (12 lakes in NY, 5 Finger Lakes, incl. Cayuga Lake)
 - (1) the presence of dreissenids,
 - (2) lake fetch length,
 - (3) lake orientation,
 - (4) phosphorus levels

Bramburger et al. 2021
 Callieri et al., 2014;
 Carey et al., 2014;
 Ewing et al. 2020
 Favot et al. 2023;
 Freeman et al., 2020;
 Gorney et al. 2023;
 Knoll et al. 2008
 Prestigiacomo et al. 2023;
 Raikhow et al. 2004;
 Reinl et al., 2021; 2023
 Sarnelle et al. 2005, 2012
 Sorichetti et al., 2014;
 Sterner et al., 2020;
 Stetler et al. 2021
 Winter et al., 2011;
 Vershoor et al. 2017

Mussels, fetch, orientation are not controllable

DEC HAB Collaborative Research

1. HABs Research Guide (2021)
2. Statewide trends and drivers of HABs – Action Plans, publications
 - Gorney et al. (2023)
 - Prestigiacomo et al. (2022), Prestigiacomo (2023).
3. Cyanotoxin degradation study
2. Riverine HABs distribution and frequency
3. HAB Formation and Foodweb Interactions
4. Remote Sensing – Satellite paired Chl-a and Phycocyanin
5. Cyanotoxin method development and validation
6. DEC-USGS Finger Lakes Advanced Monitoring
7. Inter-state, inter-agency workgroups, Great Lakes HABs Collaborative





Great Lakes HABs Collaborative NEWSLETTER

LINKING SCIENCE AND MANAGEMENT TO REDUCE HARMFUL ALGAL BLOOMS **SPRING 2024**

What's happening with the HABs Collaborative?

HABs in Ontario's Headwaters: Impacts to New York's Finger Lakes

**Anthony Prestigiacomio, New York State Department
of Environmental Conservation Finger Lakes Watershed Hub**

New York State's Finger Lakes Region – Great Lakes Connection

The Finger Lakes of central and western New York are the combined area of 11 glacially formed freshwater lakes and their watersheds. This area (see Figure 1) is approximately 4,600 square miles, extends into all or parts of 13 counties, and includes three of the ten largest lakes within New York state (NYS). Seven of the Finger Lakes are within the Seneca River basin and four are in the Genesee River basin. All drain and ultimately flow north to Lake Ontario.

Tying Finger Lakes to
Lake Ontario basin



Department of
Environmental
Conservation

LAKE AND RESERVOIR MANAGEMENT
2023, VOL. 39, NO. 1, 21–36
<https://doi.org/10.1080/10402381.2022.2129525>

The screenshot shows the Taylor & Francis Online interface. At the top, there's a navigation bar with 'Browse', 'Search', and 'Publish' options. Below that, a breadcrumb trail reads: 'Home > All Journals > Lake and Reservoir Management > List of Issues > Volume 38, Issue 4 > An evaluation of a spectral fluorometer ...'. The main content area features the journal title 'Lake and Reservoir Management' and 'Volume 38, 2022 - Issue 4'. There are buttons for 'Submit an article' and 'Journal homepage'. A search bar is present with the text 'Enter keywords, authors, DOI, etc.' and a dropdown menu for 'This Journal'. A 'Listen' button is also visible.

The screenshot shows the AWWA Water Science & Technology website. The URL is <https://awwa.onlinelibrary.wiley.com/doi/10.1002/aww2.1326>. The page displays the article title 'Patterns and impacts of cyanobacteria in a thermally stratified, oligotrophic lake' and the authors 'Anthony R. Prestigiacomo, Rebecca M. Gorney, James B. Hyde, Courtney Davis, Aimee Clinkhammer'. It also indicates 'ORIGINAL RESEARCH' and 'Open Access'.



ORIGINAL RESEARCH | Open Access |

Patterns and impacts of cyanobacteria in a thermally stratified, oligotrophic lake

Anthony R. Prestigiacomo , Rebecca M. Gorney, James B. Hyde, Courtney Davis, Aimee Clinkhammer

First published: 29 March 2023 | <https://doi.org/10.1002/aww2.1326> | Citations: 1

Guest Associate Editor: Dionysios D. Dionysiou

The screenshot shows the article page for 'An evaluation of a spectral fluorometer for monitoring chlorophyll a in New York State lakes'. The article has 1,064 views and 0 CrossRef citations to date. The authors listed are A. R. Prestigiacomo, S. G. June, R. M. Gorney, A. J. Smith, and A. C. Clinkhammer. The page was published online on 15 Nov 2022. There are buttons for 'Cite this article' and 'Check for updates'. An 'Open access' icon is also present.

Buttons for 'Figures', 'References', and 'View PDF'. The 'View PDF' button is highlighted in red.

Department of Environmental Conservation



← → ↻ 🏠 🔍 https://dec.ny.gov/environmental-protection/water/water-quality/harmful-algal-

📱 Apps 🌐 Google 🗺️ Google Maps 📖 Google Scholar 🌐 New York State Dep... 📄 Supervisor Resource...

TOP ▲ Harmful Algal Blooms (HABs)

On this page

- Know it, Avoid it, Report it!
- Staying Safe Around HABs
- The New York Harmful Algal Bloom System
- HABs Archive
- HABs Research and In-Waterbody Mitigation Research
- Clean Water Planning

The HABs Advanced Monitoring Pilot

In a NYS review of HABs, monitoring data was identified as a key component in waterbody management because monitoring data supports outreach efforts, research, water quality assessments, model development, and the ability to evaluate the success of restoration, mitigation and management efforts. To advance to the state of HABs monitoring, DEC initiated a HABs Advanced Monitoring Pilot, in collaboration with the United States Geological Survey (USGS) NY Water Science Center, to monitor and understand HABs in the Finger Lakes region. The USGS, in cooperation with DEC and DOH, developed and implemented a comprehensive monitoring strategy in four Finger Lakes that have recently been affected by HABs. This pilot was conducted on Owasco Lake, Seneca Lake, Canandaigua Lake, and Skaneateles Lake from the summer of 2018 to the fall of 2020.

For an overview of the HABs Advanced Monitoring Pilot, please see [Advancing the Understanding of HABs in New York State: The HABs Advanced Monitoring Pilot Fact Book](#).

For a summary of the Pilot's Purpose, Scope, and Objectives, Summary of Major Findings, Data Products and Publications, and Additional Information, please see [NYSDEC/USGS HABs Advanced Monitoring Pilot: Project Summary](#).

Accomplishments:

- 2 websites

peer-reviewed papers
s (all data publicly

science thesis
ranchise plans, other docs

HABs Advanced Monitoring Project Summary



Home > Environmental Protection > Water > Water Quality

Monitoring Pilot...

On this page

Purpose, Scope, and
Objectives

Summary of Major Findings,
Data Products, and

NYS
Pro

Purpose, Scope, and Objectives

Monitoring Pilot:

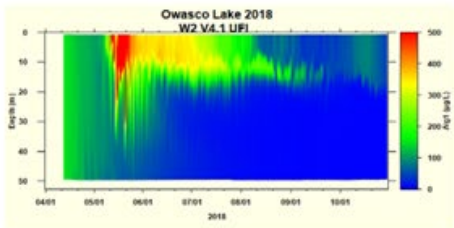
Monitoring data has been identified as a key component in harmful algal bloom (HAB) management because it supports

Owasco Lake Model

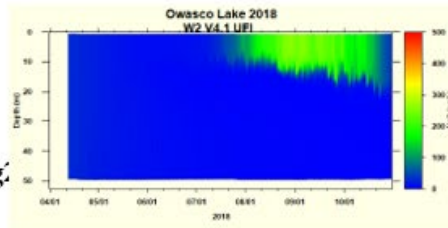
With Mussels “On” – higher Cyano levels near surface

Current

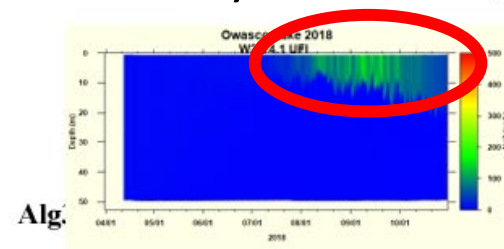
Diatoms (a)



Greens (b)



Cyanos (c)



Alg.

Alg.

In-Waterbody Mitigation

In-Waterbody Mitigation Research

1. Approaches in combination – chemical (algaecides) and physical; scale of treatments
2. Ultrasonic devices – Lake Carmel, Lake Agawam, Lake Welch
3. Ultrasonic Zooplankton/Phytoplankton Study
4. Ultrasonic Fish Response – mesocosm and in-situ
5. In-lake feasibility study – Honeoye, Conesus Lakes
6. Agawam algal skimmer and hydrogen peroxide/oxidation
7. Electrochemical Oxidation and Hydrodynamic Cavitation



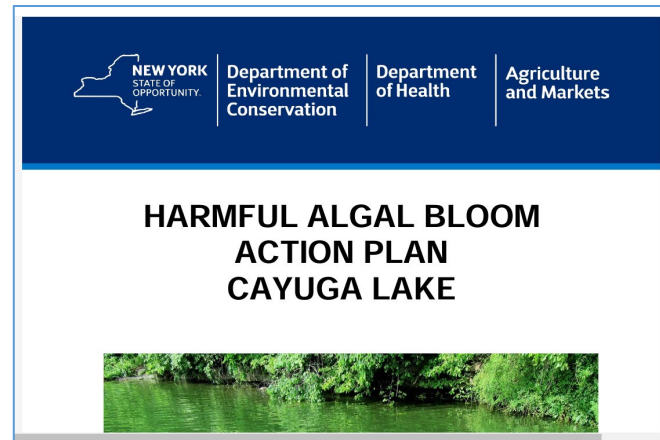
[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)

Progress in Cayuga's Watershed

Cayuga's Clean Water Plans

Existing and On-going Planning Documents

1. HAB Action Plan (DEC, Cayuga)
 - complete/implementation ongoing
2. TMDL (DEC)
 - drafted/**implementation ongoing**
3. DWSP2s (DEC, Cayuga)
 - several in development
4. Cayuga Lake WRPP (DOS, Cayuga)
 - complete/implementation ongoing
5. SWCD Strategic Plans (SWCDs)
 - complete/implementation ongoing

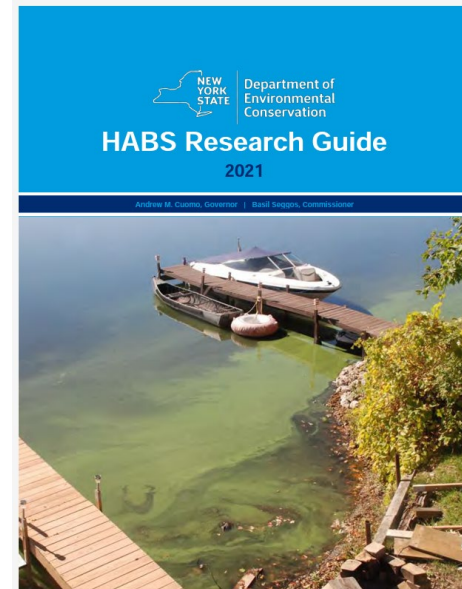


Funding for Implementation: DEC

Historic investments, current high allocations for water and environmental issues

DEC Funding for HABs Initiative (since 2017)

- ~\$428M in grants statewide to reduce the frequency of algal blooms



Cayuga Specific Funds for Phosphorus Reduction

- Using Cayuga's Clean Water Plans
- Implemented Projects – Cayuga L., 2013-2022
- **40 implementation projects awarded**
- **More than \$14 M in funding to Cayuga, more than 39,000 lbs P/yr reduced**
 - nutrient management, cover crops;
 - streambank stabilization, hydroseeding;
 - land acquisition, buffers, exclusion;
 - septic pump outs;



Upgrades to WWTPs
TMDL recommendations for
Freeville and Interlaken
being implemented

Other Great Lakes/Finger Lakes Funding

- Finger Lakes Cover Crops Rnd 1/Rnd 2 (\$670,000 total)
- Finger Lakes Small Grants – Rnd 1 (\$350,000 available)
- Great Lakes Program Small grants
- Great Lakes Sediment Nutrient Reduction Program
- Sustain our Great Lakes Program
- Great Lakes Action Agenda
- Finger Lakes Action Agenda (in development)





[Environment](#) [Recreation](#)

JUNE 3, 2024 | Albany, NY

Governor Hochul Announces Creation of Cayuga Shores Wildlife Management Area in Tompkins County

\$2.5 Million Investment in Former Bell Station Property Will Permanently Protect 3,500 Feet of Pristine Cayuga Shoreline From Development and Enhance Recreational Opportunities

Governor Kathy Hochul today announced the permanent protection of the 287-acre Cayuga Shores Wildlife Management Area, which provides public access to 3,500 feet of pristine shoreline on the east side of Cayuga Lake in Tompkins County. Located in the town of Lansing, the Cayuga Shores Wildlife Management Area features a variety of exceptional fish and wildlife habitat including multiple streams, wooded hillsides and extensive fields.

Tony Prestigiacommo

Research Scientist 3

Supervisor Finger Lakes Watershed Hub

615 Erie Blvd. West; Syracuse, NY 13204

anthony.prestigiacommo@dec.ny.gov

(315) 426-7452

