



Department of
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Conservation

30 (actually 33) Years of CSLAP

What Have We Learned about NYS Lakes?

Scott Kishbaugh, PE, NYSDEC
Chief, Lake Monitoring and Assessment Section
(for about eight more hours....)

May 4, 2019

Subtitle: What to say at the end...(the last talk)



...and no-one ever heard from that Kishbaugh guy again

Stuff We Learned

It takes a village

They show up in the darndest places

The wide world (state) of HABs

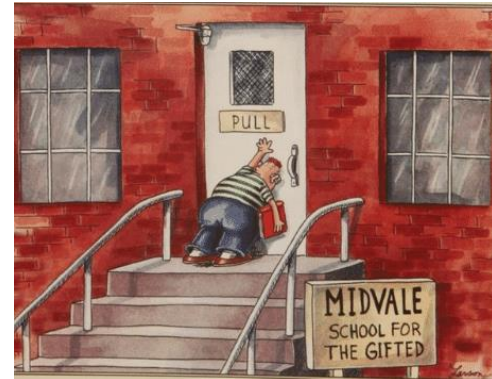
Volunteers can collect boat loads of data

And insights into the lakes of New York

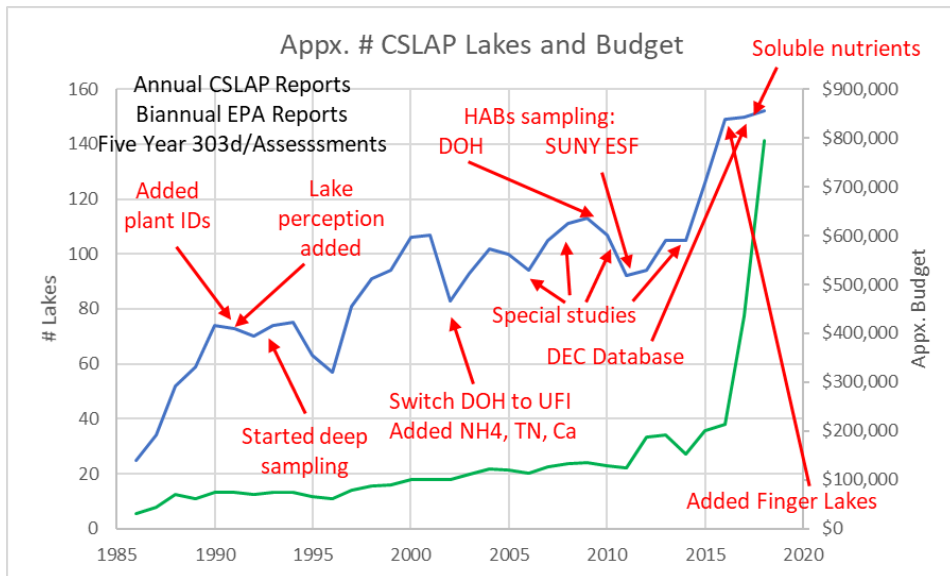
Change comes slowly

Trump is wrong (climate change is real)

I've run out of time



What's CSLAP all about?

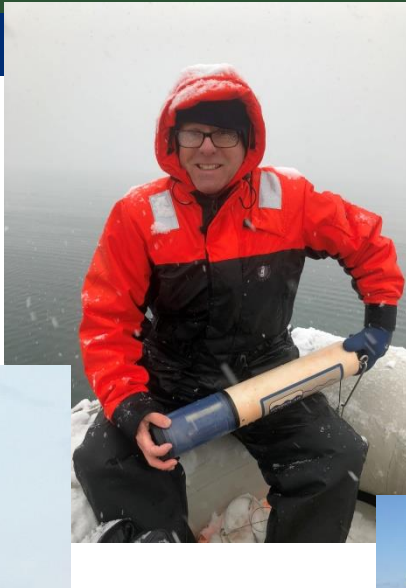


- Water quality monitoring
- HABs sampling and outreach
- Invasive species IDs
- Lake reports
- State and federal reporting
- Local management
- Permitting

- Lake assessments
- Databases
- Data sharing
- Presentations
- Special studies
- Training




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It takes a
village...FINGER
LAKES HUB





L  AS





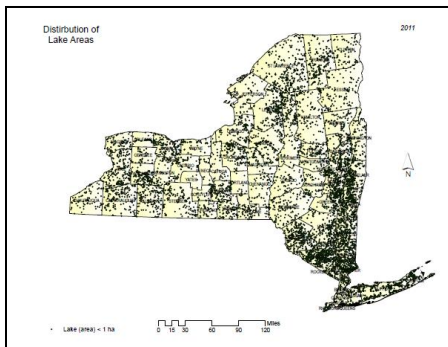
Sometimes all it takes is a super hero!

MUELLER

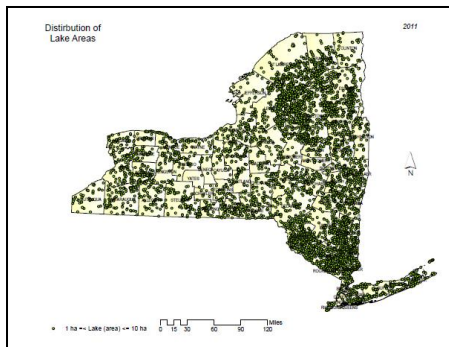


And let's not forget about the weight carried by NYSFOLA and their own god(dess)

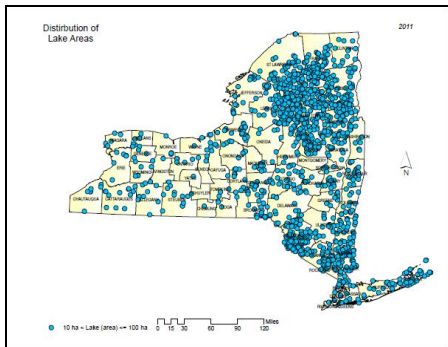
So much water, so few diviners



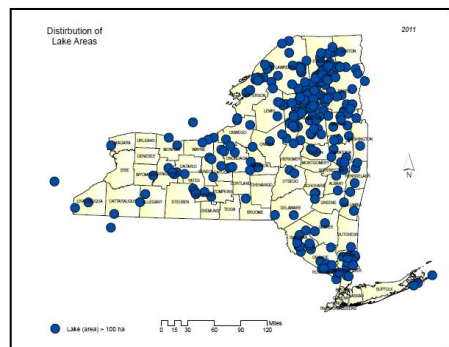
Ponded waters 0.1-1 ha



Ponded waters 1-10 ha



Ponded waters 10-100 ha



Ponded waters >100 ha

NYSDEC responsible for evaluating the state of NY water resources (private and public)

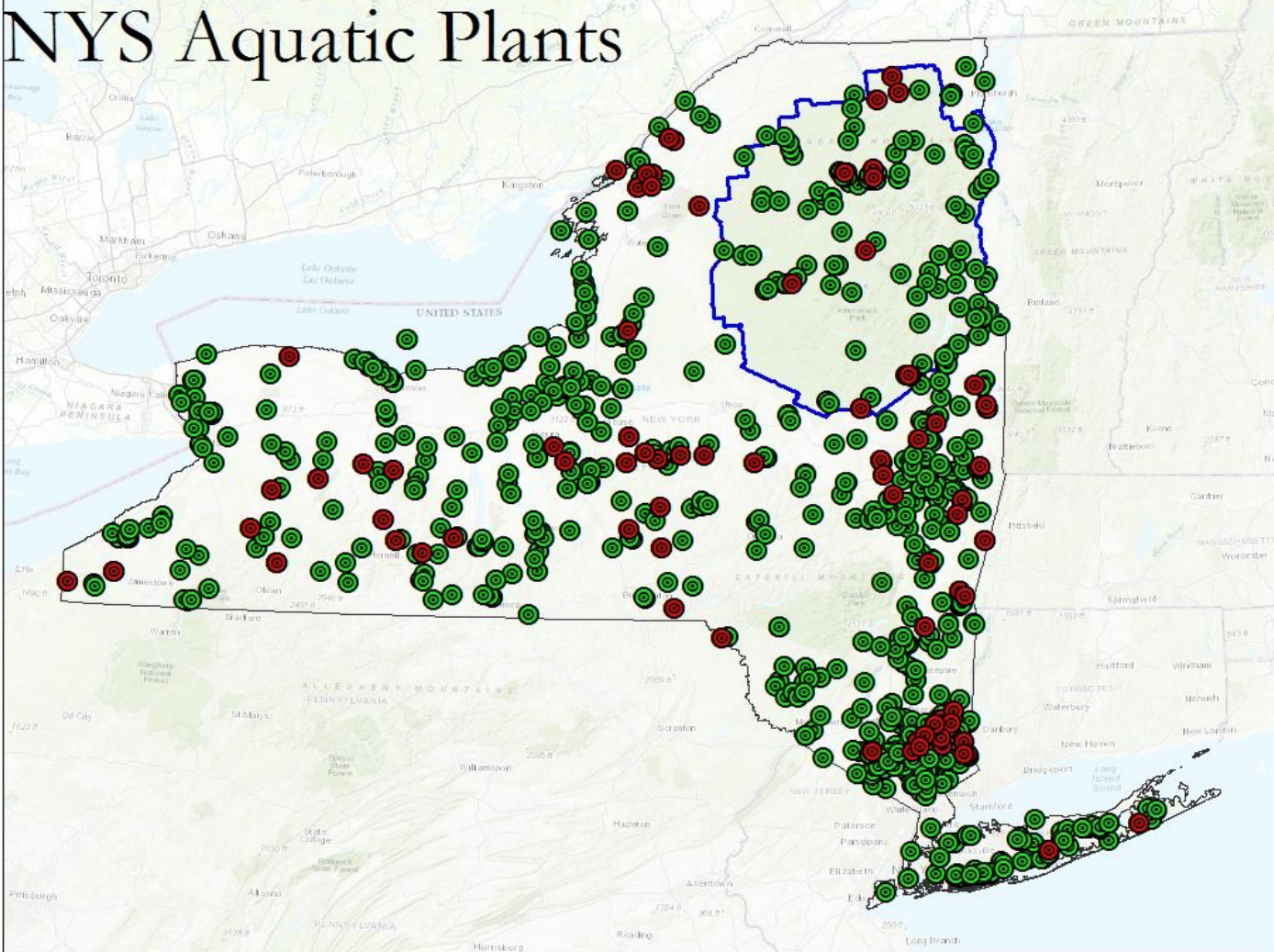
>16,000 lakes, ponds and reservoirs > 0.1 acres

7 NYSDEC DOW statewide monitoring staff, 4 HUB staff- some assistance from regional DOW/DFW staff



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NYS Aquatic Plants



Finding AIS in lakes

CSLAP became the model for other volunteer (plant monitoring) programs

Table 3.7: Exotic Plant Identifications by CSLAP Volunteers and Others

Year	New Lakes Found by CSLAP Volunteers	New Exotics Found by CSLAP Volunteers	New Lakes Found by Others	New Exotics Found by Others
2006-2010	7	18	131	227
2001-2005	6	11	114	174
1996-2000	21	26	27	38
1991-1995	41	51	16	20
Pre-1991			78	99

Lakes found: year in which first exotic plant species was found or verified in lake

Exotics found: year in which any new exotic plant species was found or verified in lake

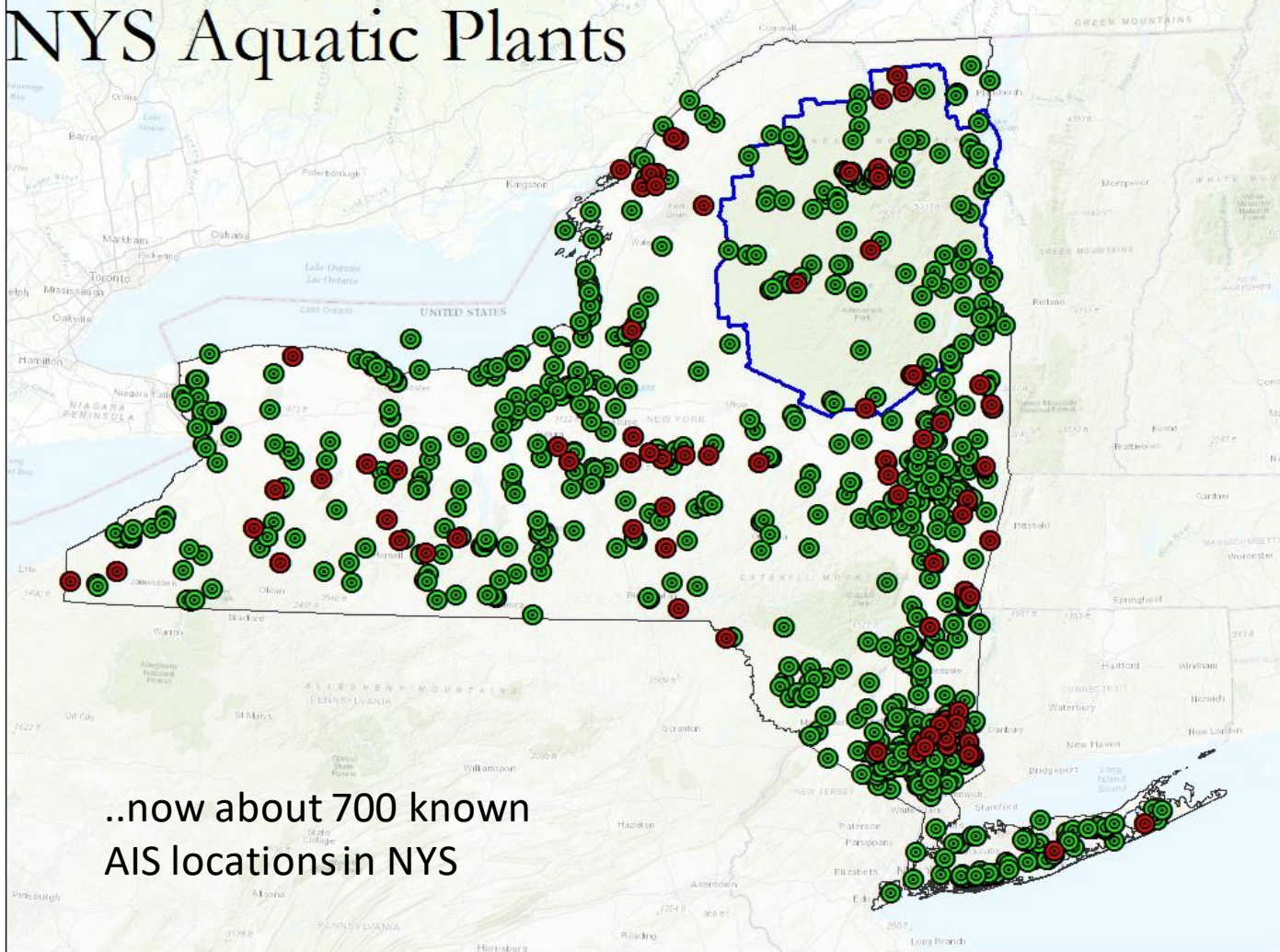
First year CSLAP
looked for AIS

72% of all new AIS lakes and
plant IDs from CSLAP
volunteers



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NYS Aquatic Plants



Efner Lake

Jenny Lake

Hunt Lake



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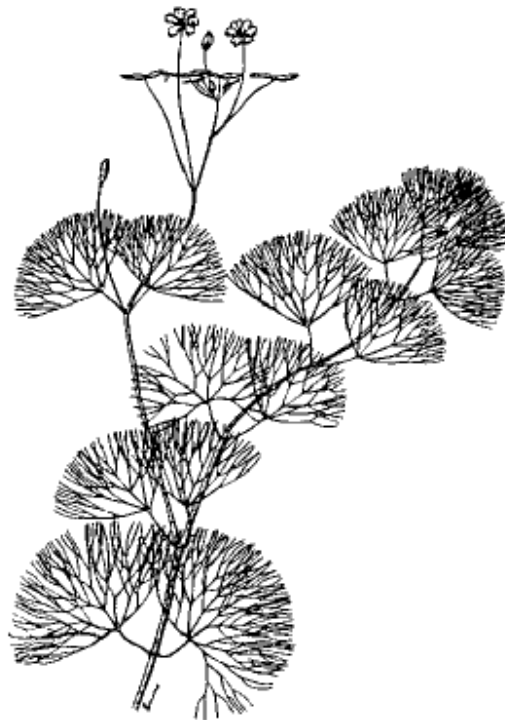
Looky here!

Fanwort (*Cabomba caroliniana*) is an exotic plant never found outside of Long Island

...until found by CSLAP volunteers in three southeastern Adirondack lakes

Continuing surveillance to determine if management needed

Finding has altered botanists understanding of this plant and its distribution and growth patterns in NYS lakes



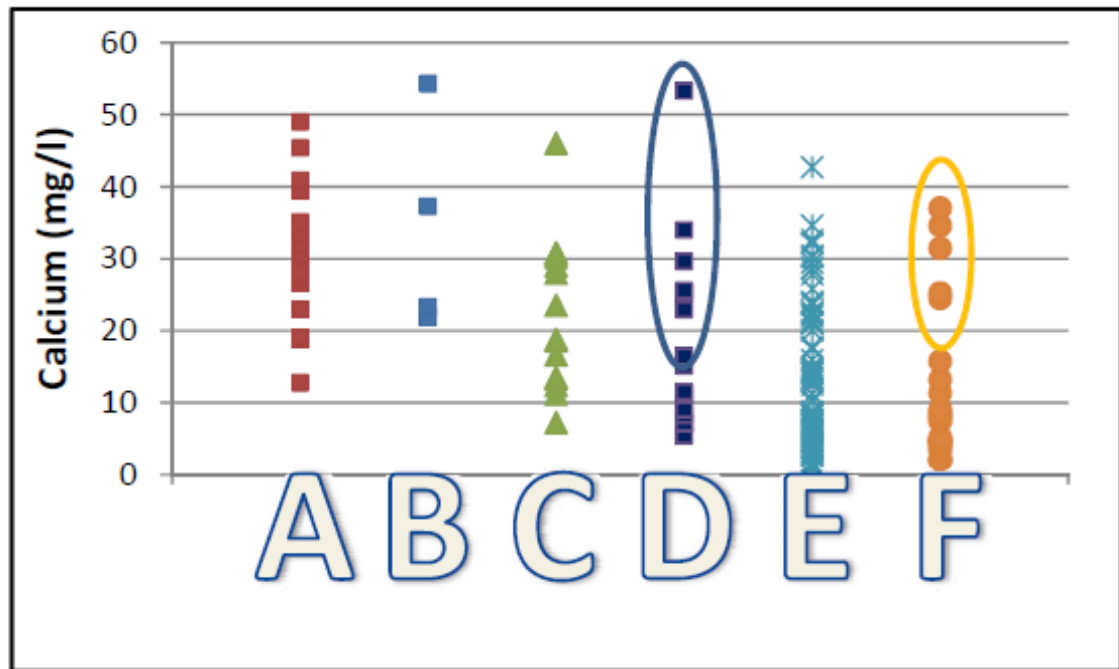


Figure 5.7: Calcium Distribution among Several Classes of CSLAP Lakes

Legend:

A = lakes with zebra mussels and public access

B = lakes with zebra mussels and no public access

C = lakes without zebra mussels, without public access, and within 15 miles of a zebra mussel location

D = lakes without zebra mussels, with public access, and within 15 miles of a zebra mussel location

E = lakes without zebra mussels, without public access, and more than 15 miles from a zebra mussel location

F = lakes without zebra mussels, with public access, and more than 15 miles from a zebra mussel location



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Why volunteers are critical for finding stuff

Agency site visits are limited by staff, funds, logistics

Volunteers are free, evaluation can be free

Outreach recognizes we can't get samples everywhere

Lake residents communicate with neighbors

Management (short/long term) requires local support

Affected samplers become strong advocates

Much about water quality is about location (location..)

Samplers know what is normal at their lake

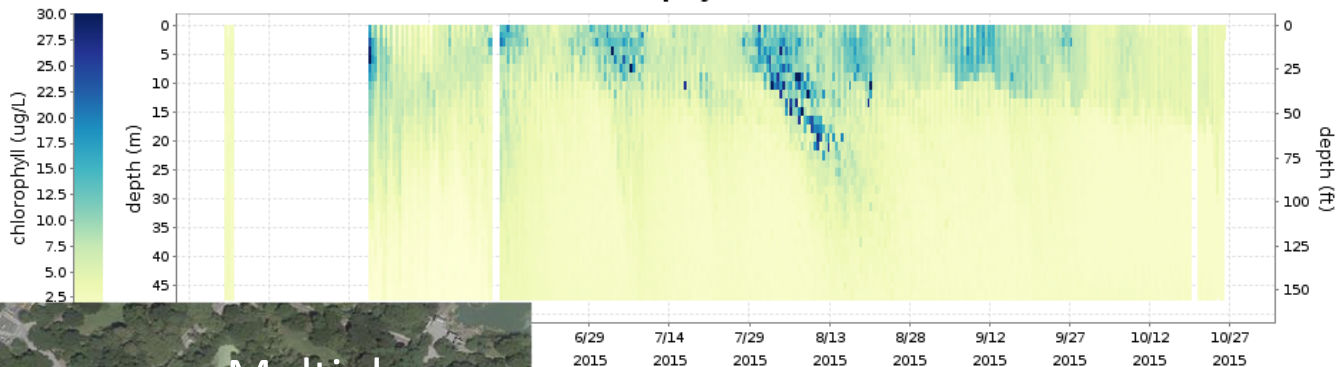
Blooms crop up (and crop down) unpredictably

Lakefront residents are in best position to track

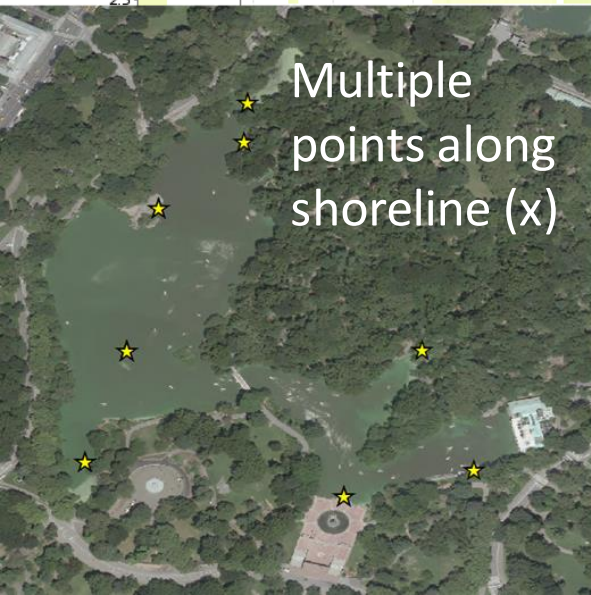


Blooms often heterogeneous in time (t) and vertical (z) space

Chlorophyll

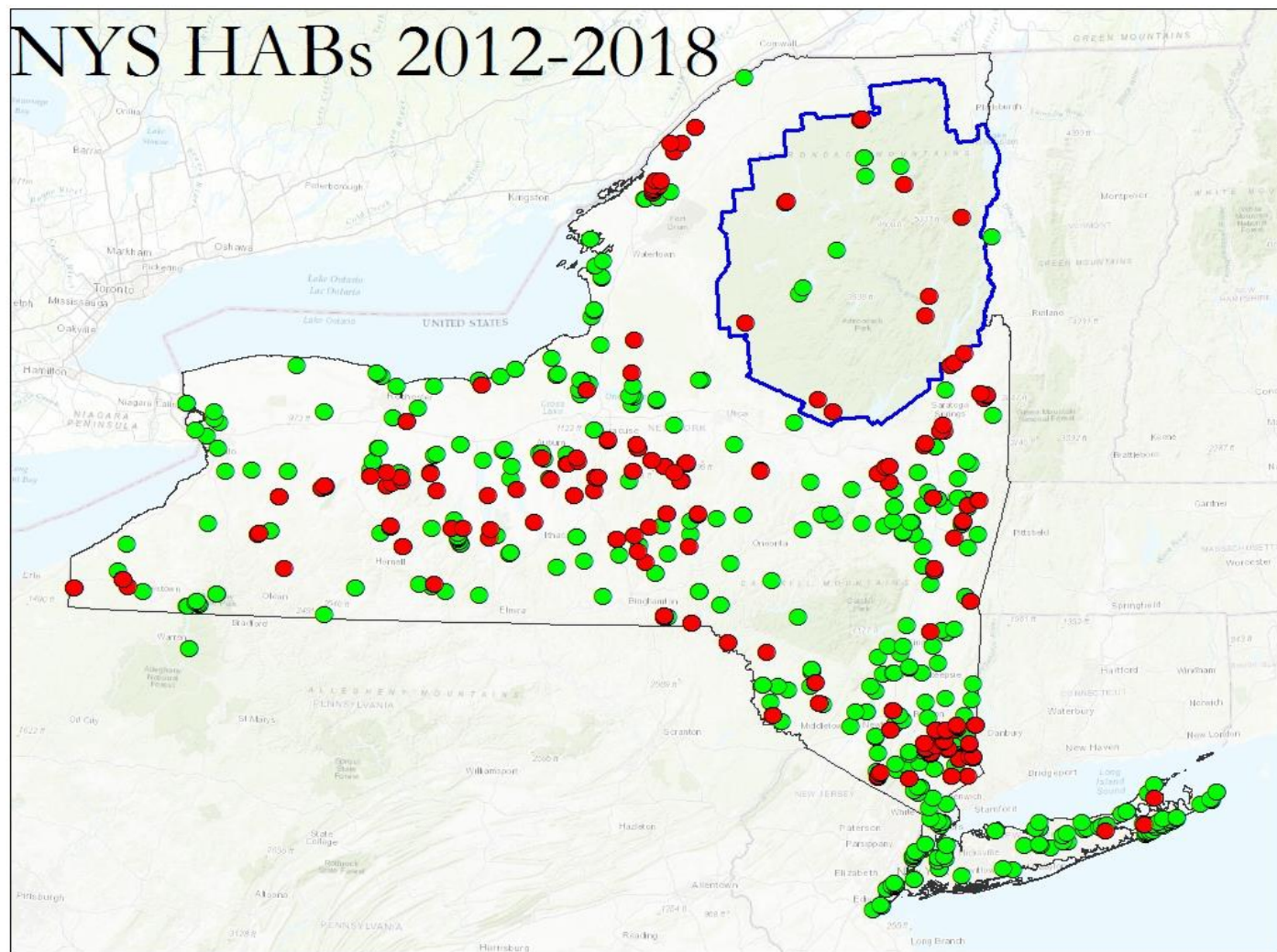


data source: ysixylem_logger@owasco

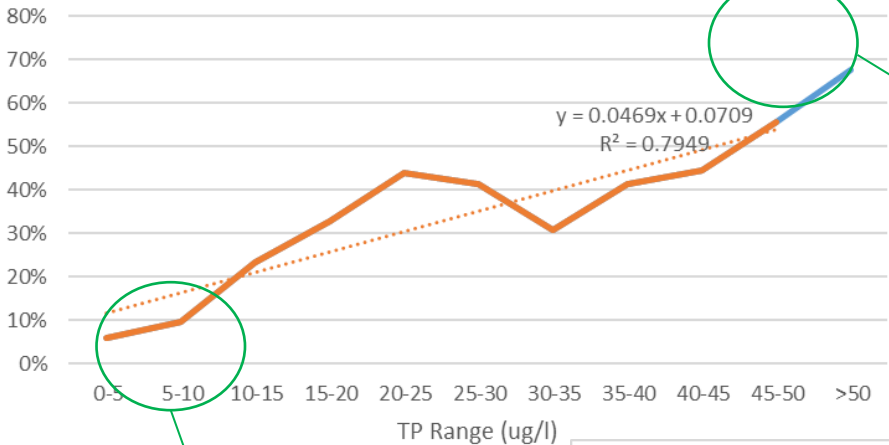


Source- OLWIP

NYS HABs 2012-2018



% Lakes with Shoreline HABs

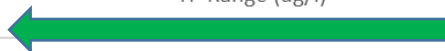
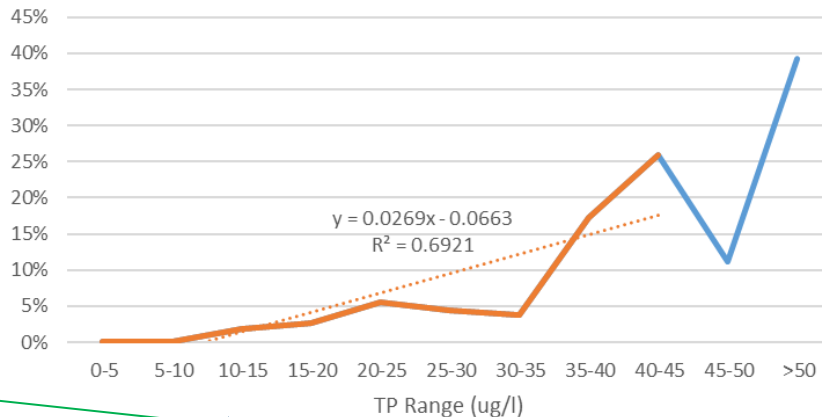


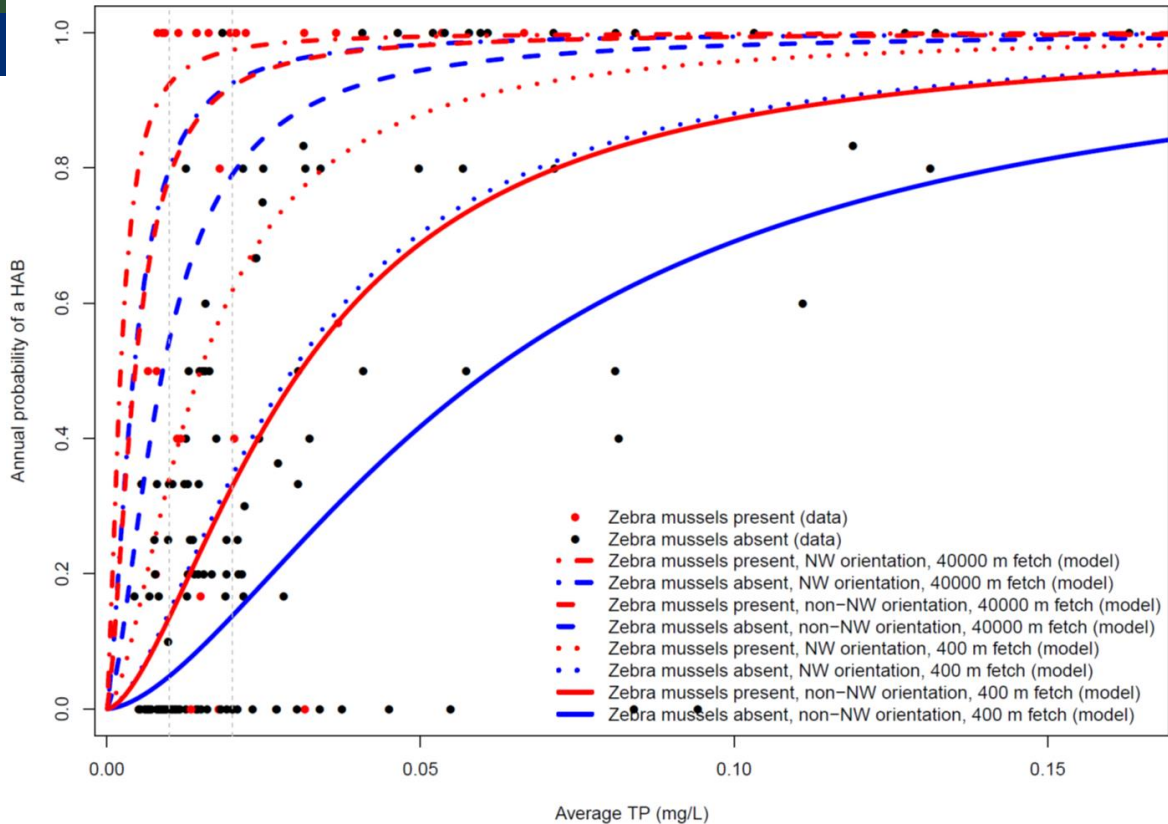
Why are some high P lakes not blooming?

Why are some low P lakes blooming?

Will reductions in P lead to elimination of blooms?

% Lakes with Open Water HABs





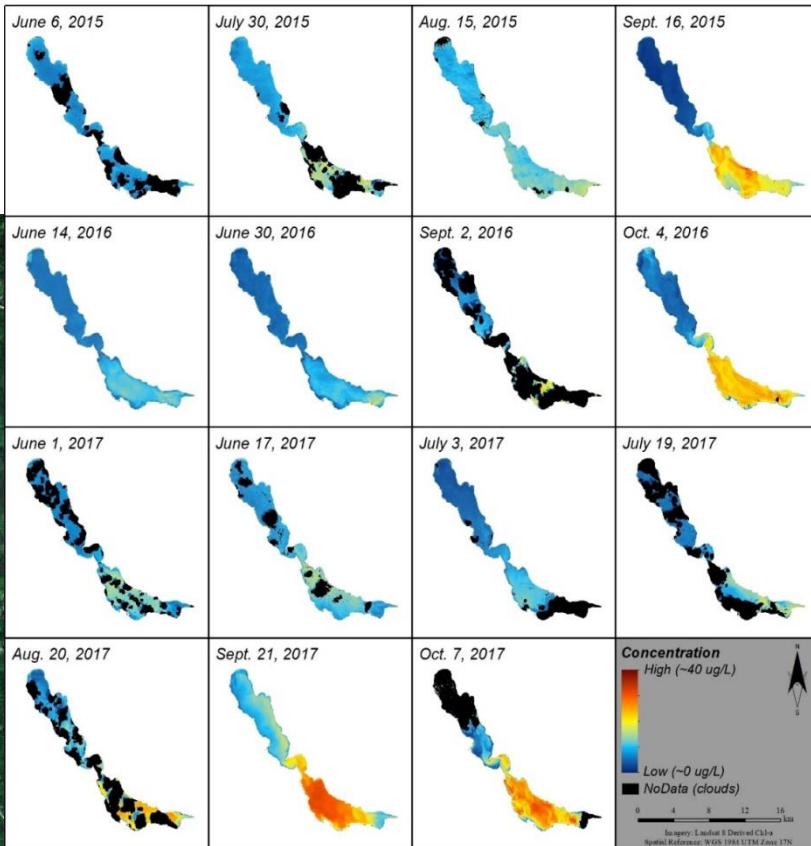
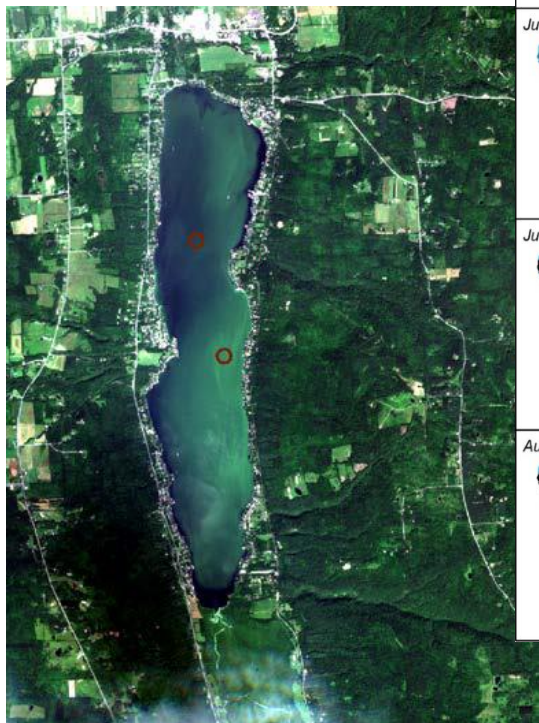
Major explanatory variables of NYS HABs

- TP concentration
- Lake fetch
- Dreissenid
- Mussels
- Polymixis
- Lake orientation



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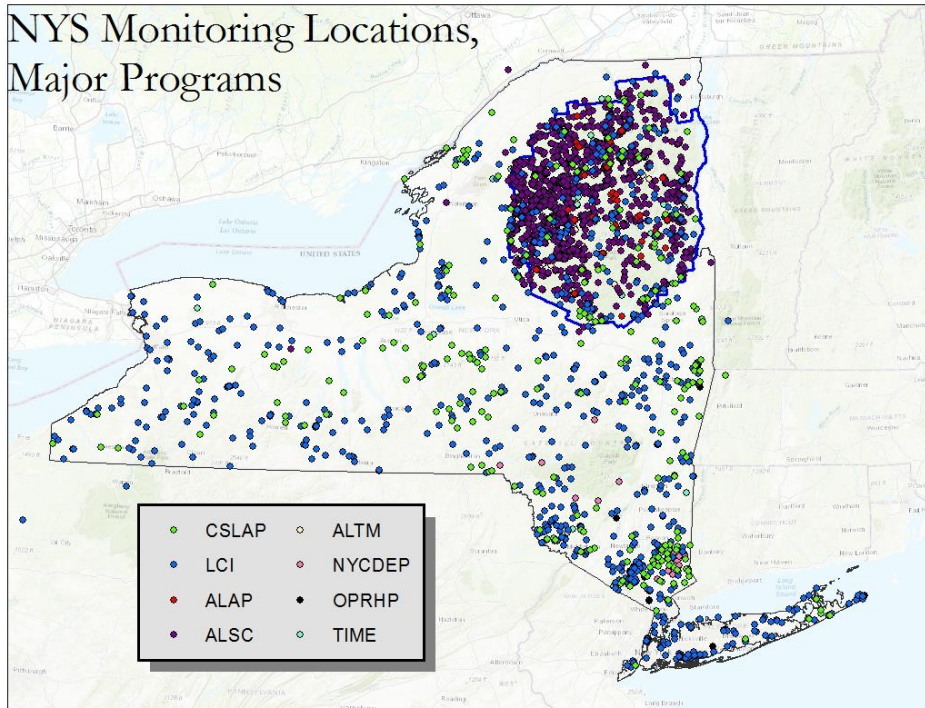
Moving forward



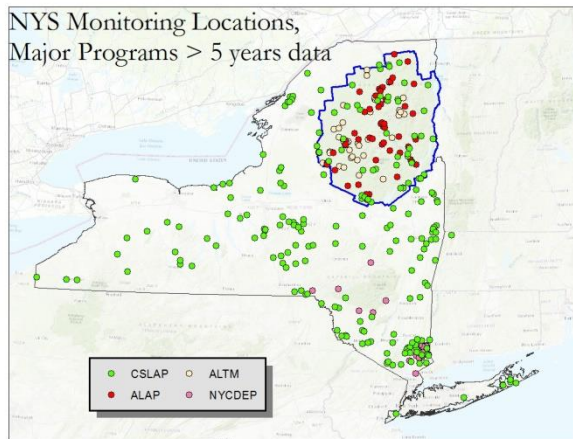
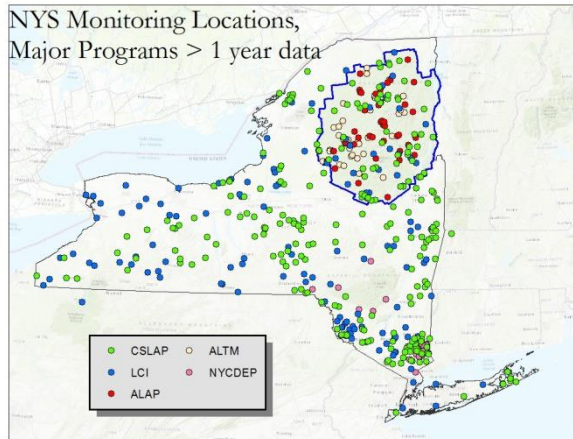
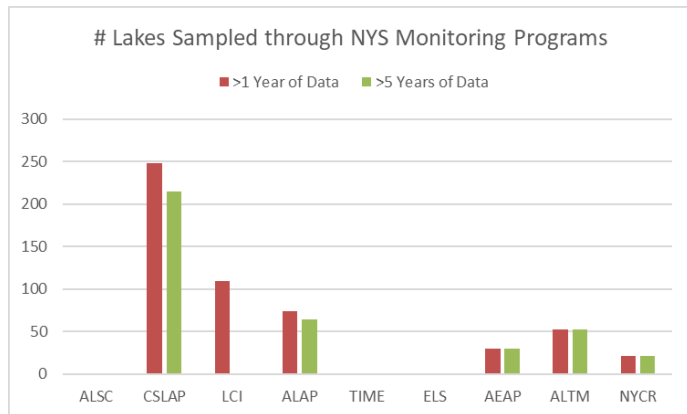
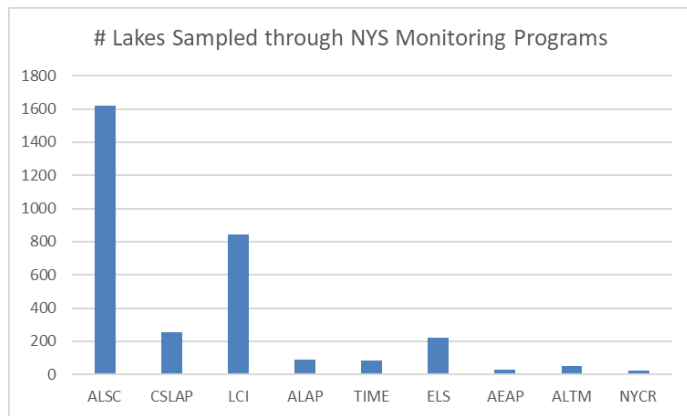
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State Lake Water Quality Database

2600+ lakes sampled since mid-1980s



State Water Quality Database



Why is that important?

Cossayuna Lake (1103-0002)

Impaired Seg

Waterbody Location Information

Revised: 12/06/2006

Water Index No:	H-301-17-979	Str Class:	A	Drain Basin:	Upper Hudson River
Hydro Unit Code:	02020003/080			Reg/County:	Upper Hudson-Hosic
Waterbody Type:	Lake			Reg/County:	5/Washington Co. (38)
Waterbody Size:	659.3 Acres			Quad Map:	COSSAYUNA (I-27-1)
Seg Description:	entire lake				

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
Aquatic Life	Stressed	Possible
RECREATION	Impaired	Known
HABITAT/HYDROLOGY	Impaired	Known

Type of Pollutant(s)

Known: ALGAL/WEED GROWTH, NUTRIENTS (phosphorus), PROBLEM SPECIES, Silt/Sediment
 Suspected: ---
 Possible: Pathogens

Source(s) of Pollutant(s)

Known: HABITAT MODIFICATION
 Suspected: FAILING ON-SITE SYST, Agriculture, Construction
 Possible: ---

Resolution/Management Information

Issue Resolvability:	1 (Needs Verification/Study (see STATUS))	
Verification Status:	4 (Source Identified, Strategy Needed)	
Lead Agency/Office:	DOW/Reg5	Resolution Potential: Medium
TMDL/303d Status:	3a~1 (0)	

Further Details

Recreational uses (swimming, fishing, boating) in Cossayuna Lake are considered to be impaired due to nutrient (phosphorus) enrichment, and aquatic weed growth (including invasives) in this eutrophic lake. The primary source of these impacts are failing and/or inadequate on-site septic systems serving lakefront residences, nonpoint runoff of nutrients and sediment from the lake watershed and habitat modification (related to the invasive species).

Cossayuna Lake has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 1992 and continuing through 2005. An Interpretive Summary report of the findings of this sampling was published in 2006. These data indicate that the lake continues to be best characterized as eutrophic, or highly productive, although productivity has been somewhat lower over the most recent five years. Phosphorus levels in the lake regularly exceed the state guidance criteria for impacted recreational uses, resulting in transparency measurements that at times fail to meet what is recommended for swimming beaches. However water clarity readings have improved in the most recent years of sampling. (DEC/DOW, BWAM/CSLAP, May 2006)

Public perception of the lake and its uses is also evaluated as part of the CSLAP program. These assessment also

NYSDEC may require multiple years of data to conduct lake assessments

At least 5 years of data (40 data points) needed to start evaluating trends

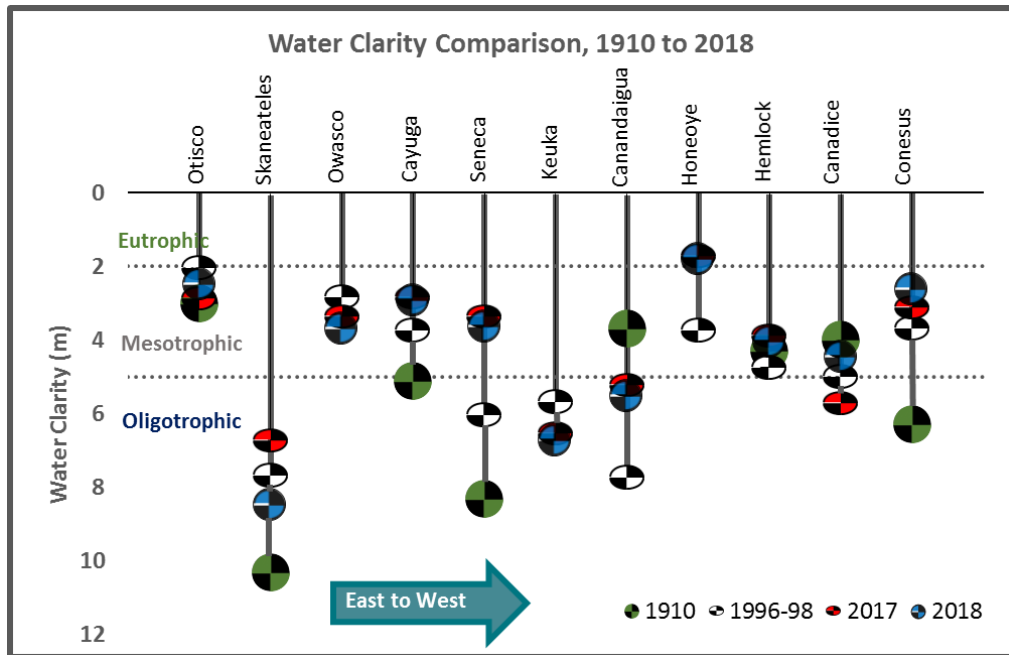
NYSDEC also requires ELAP certified labs and QAPPs

CSLAP among few programs that can meet all requirements



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What does CSLAP say about my lake? (Trends Pt 1)



Degradation 1910 – 1970's

Improvements 1970's – 1990's (rarely clearer than 1910)

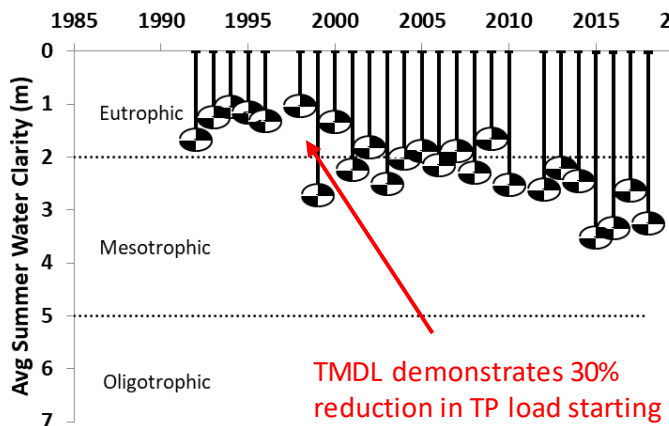
Minor changes (positive and negative) late 1990's to mid 2000's and recent years

Comparable clarity between 2017 and 2018

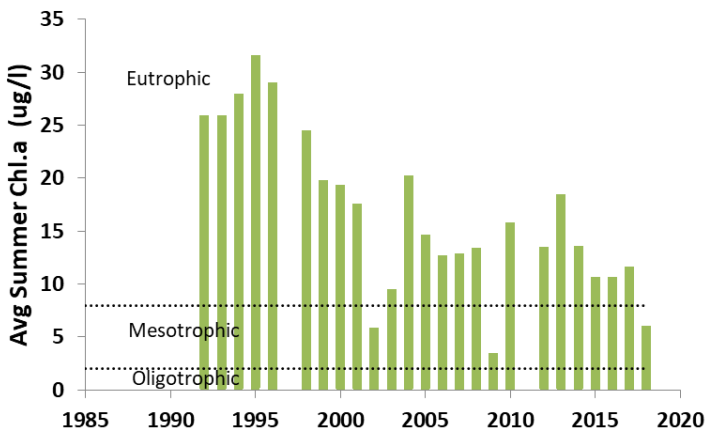
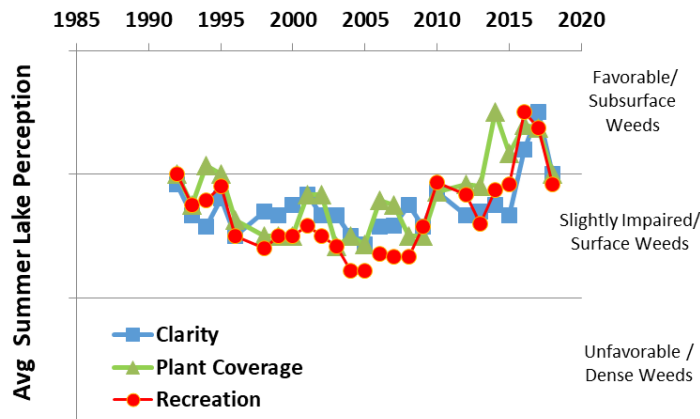
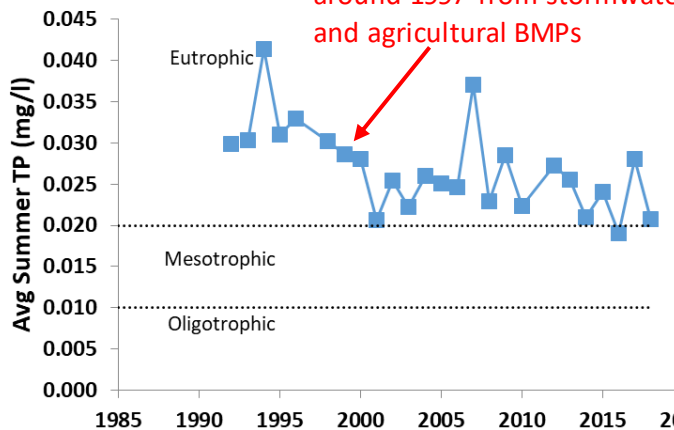


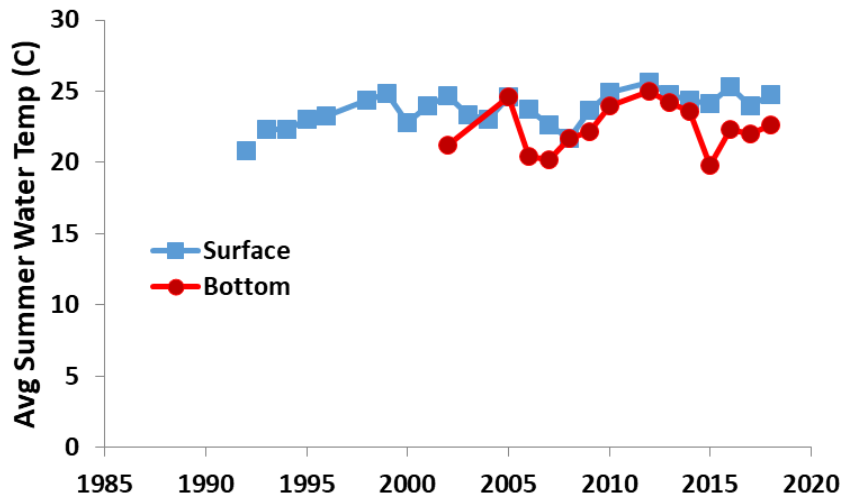
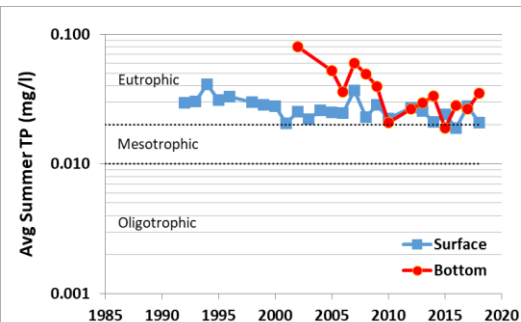
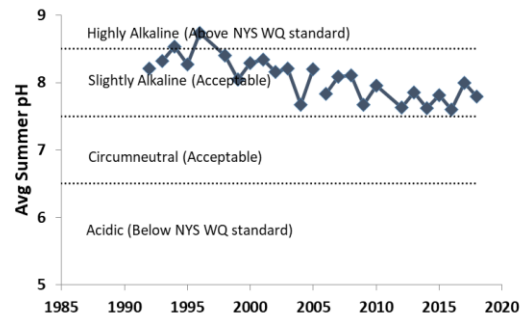
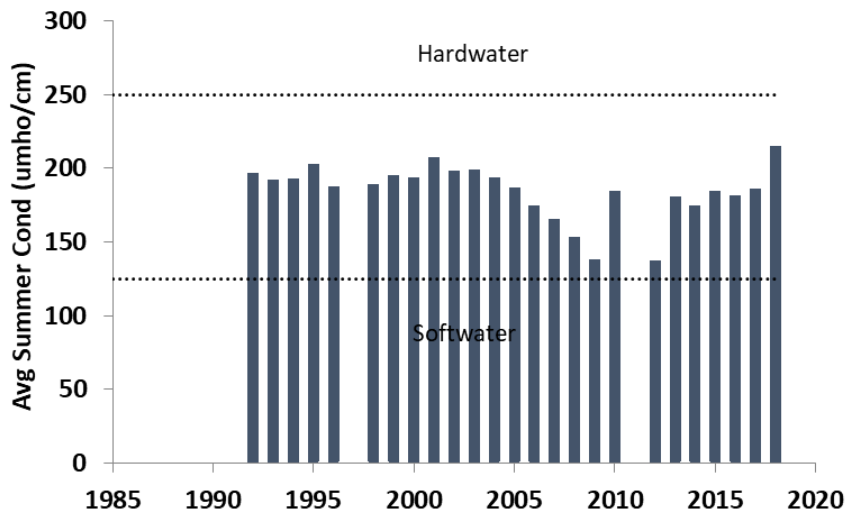
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What does CSLAP say about my lake? (Trends Pt 2)

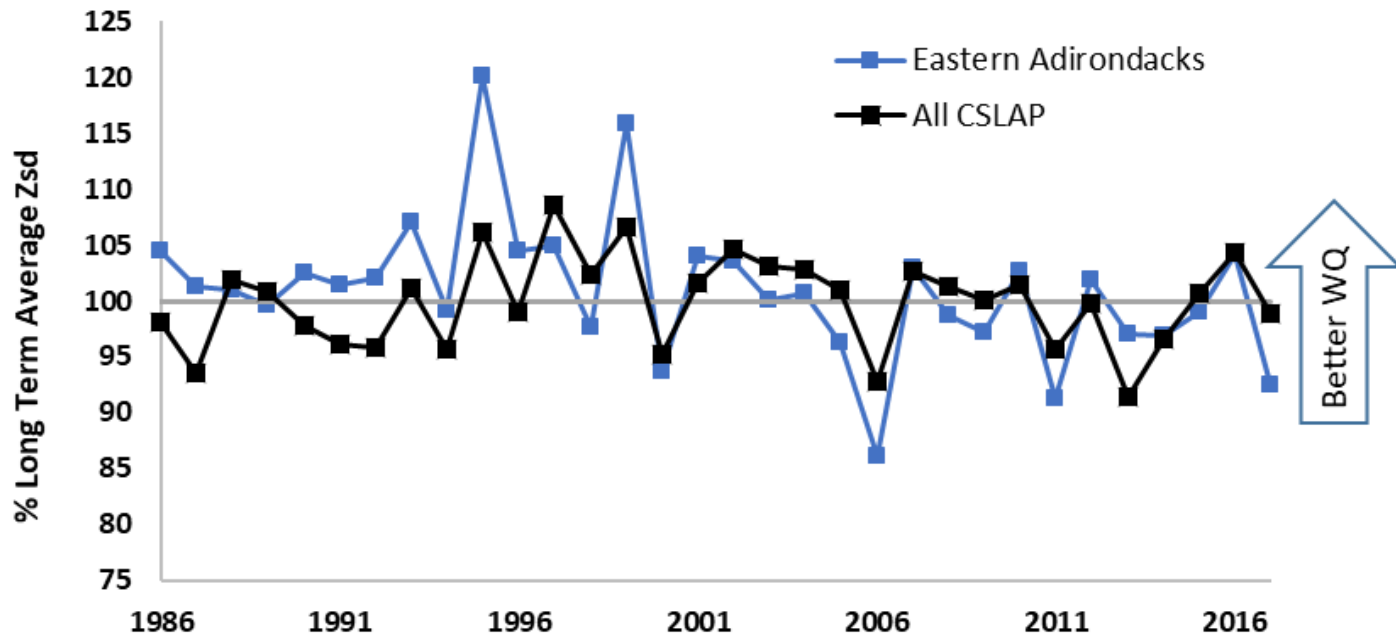


TMDL demonstrates 30% reduction in TP load starting around 1997 from stormwater and agricultural BMPs

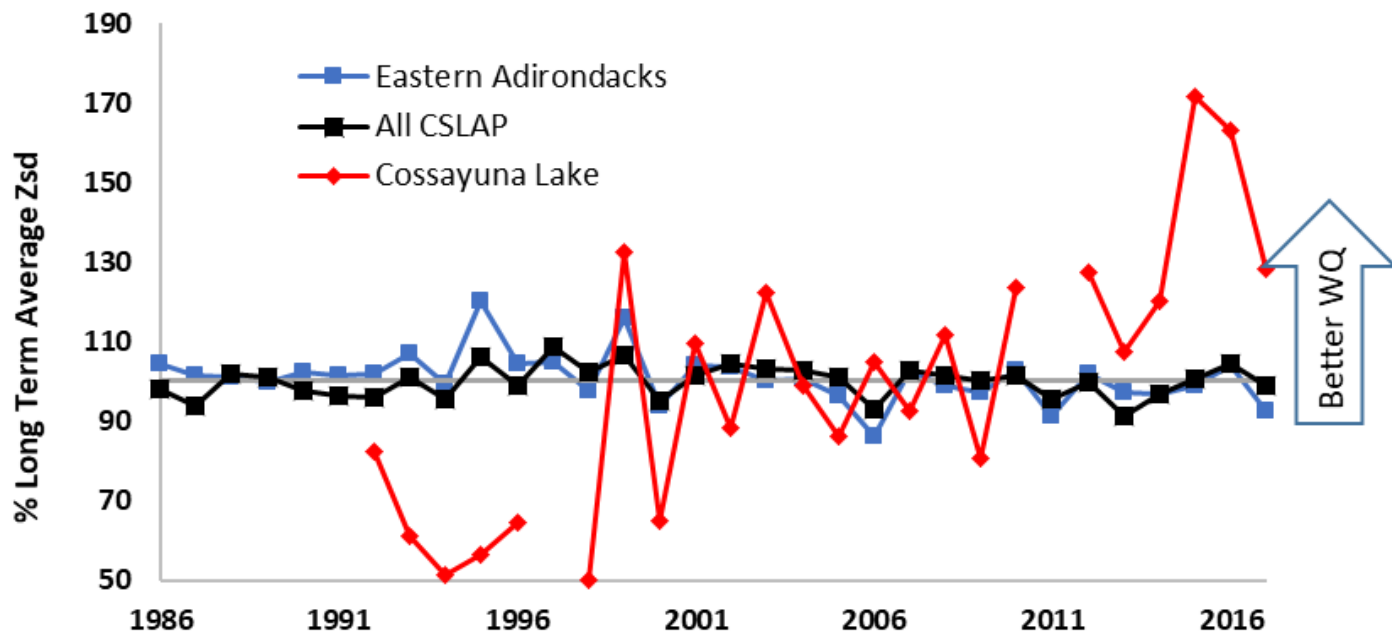




Normalized Clarity for Eastern Adirondack Lakes Compared to CSLAP



Δ Clarity for Eastern Adk and CSLAP Compared to Cossayuna Lake



What does CSLAP say about statewide trends?

	Secchi	TP	Chl.a	QA	QB	QC
Significant Increase	6%	5%	1%	5%	6%	4%
Increase	3%	5%	3%	2%	8%	4%
No change	79%	89%	88%	81%	79%	78%
Decrease	8%	1%	5%	5%	4%	6%
Significant Decrease	3%	0%	3%	7%	2%	7%

148 CSLAP lakes sampled in 2017 and for at least five years
Change measured by combination of regression and p values



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What does CSLAP say about statewide trends?

	Cond	pH	Color	Temp
Significant Increase	14%	3%	7%	6%
Increase	12%	7%	13%	14%
No change	69%	72%	86%	75%
Decrease	3%	5%	0%	1%
Significant Decrease	1%	13%	1%	4%

148 CSLAP lakes sampled in 2017 and for at least five years
Change measured by combination of regression and p values



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(Moments Before) The Start of Global Warming...

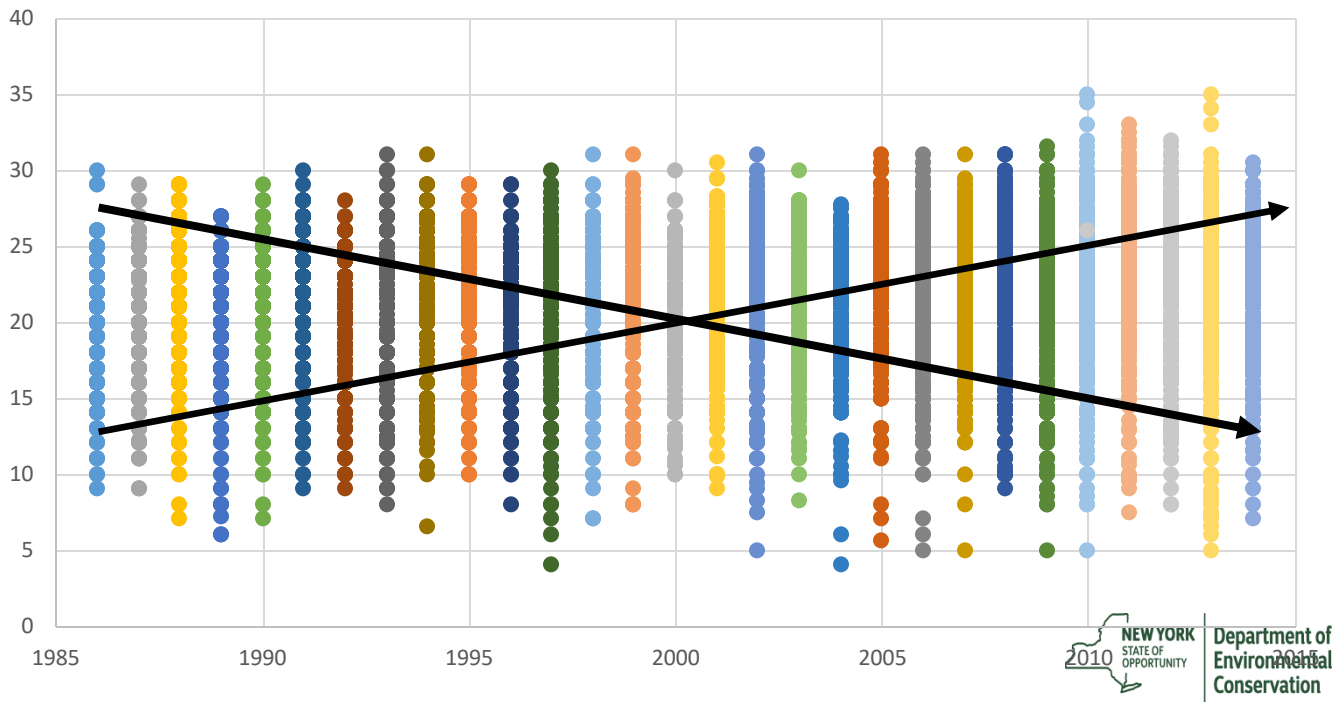
(the start of global climate change may be difficult to pinpoint, and very little sampling was done before that)

(oh, and most NYS lakes data not collected to explicitly document climate change)



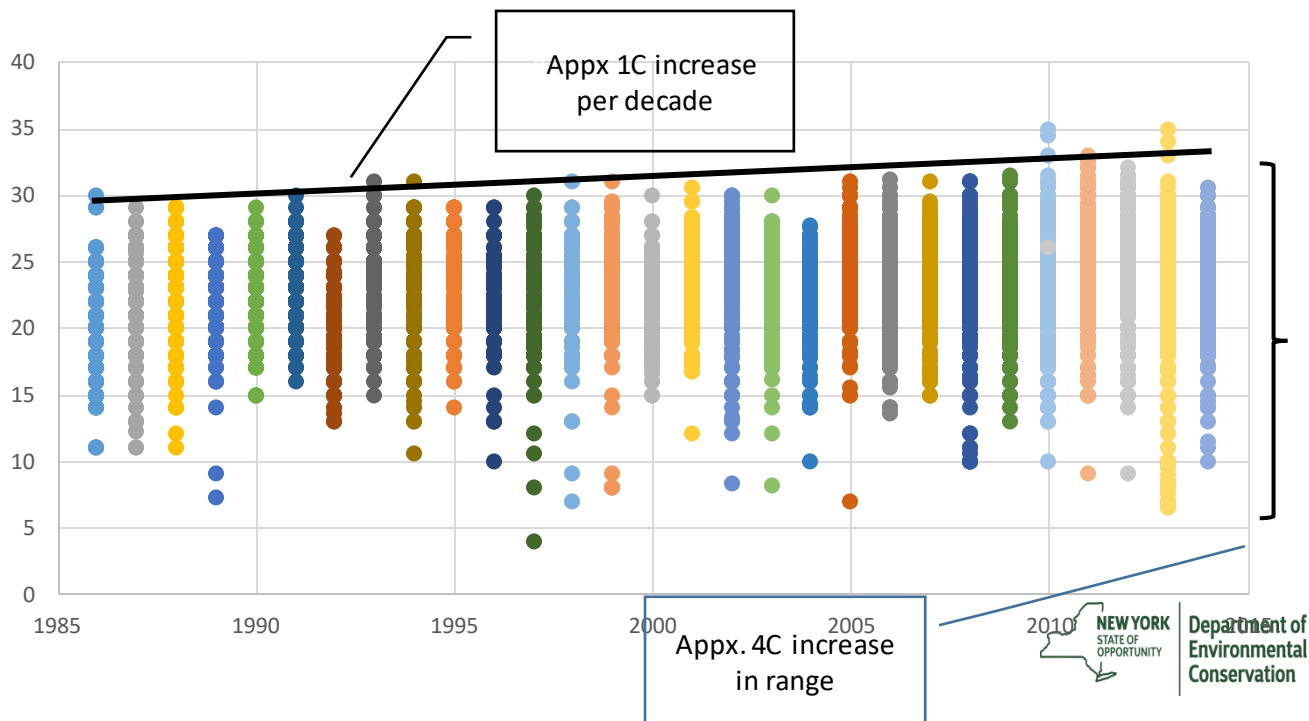
Lets look at all data.....

Water Temperatures CSLAP Lakes 1986-2014

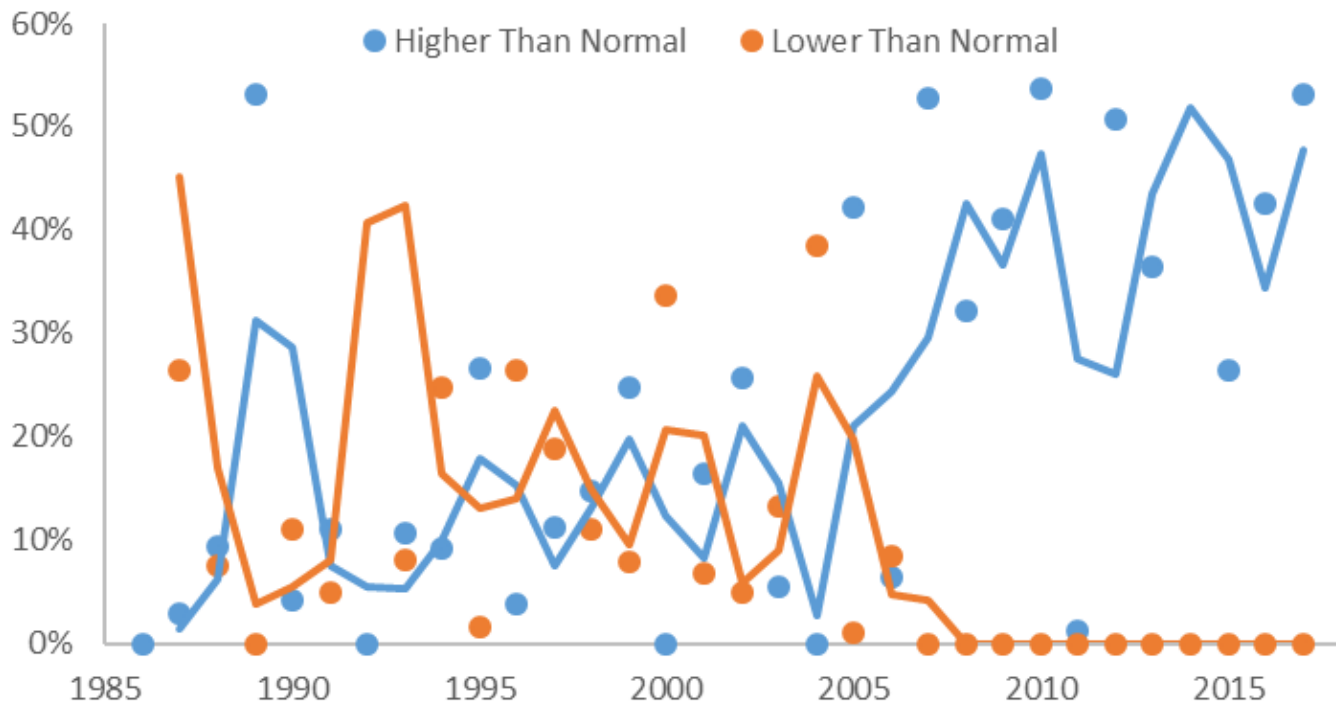


Just looking at stratification period...

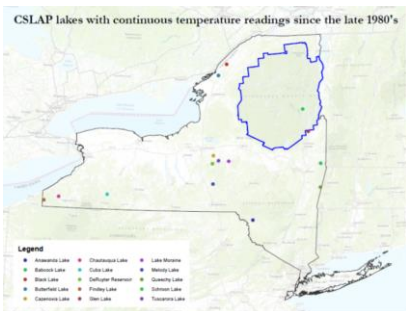
Water Temperatures CSLAP Lakes 1986-2014, Index Period



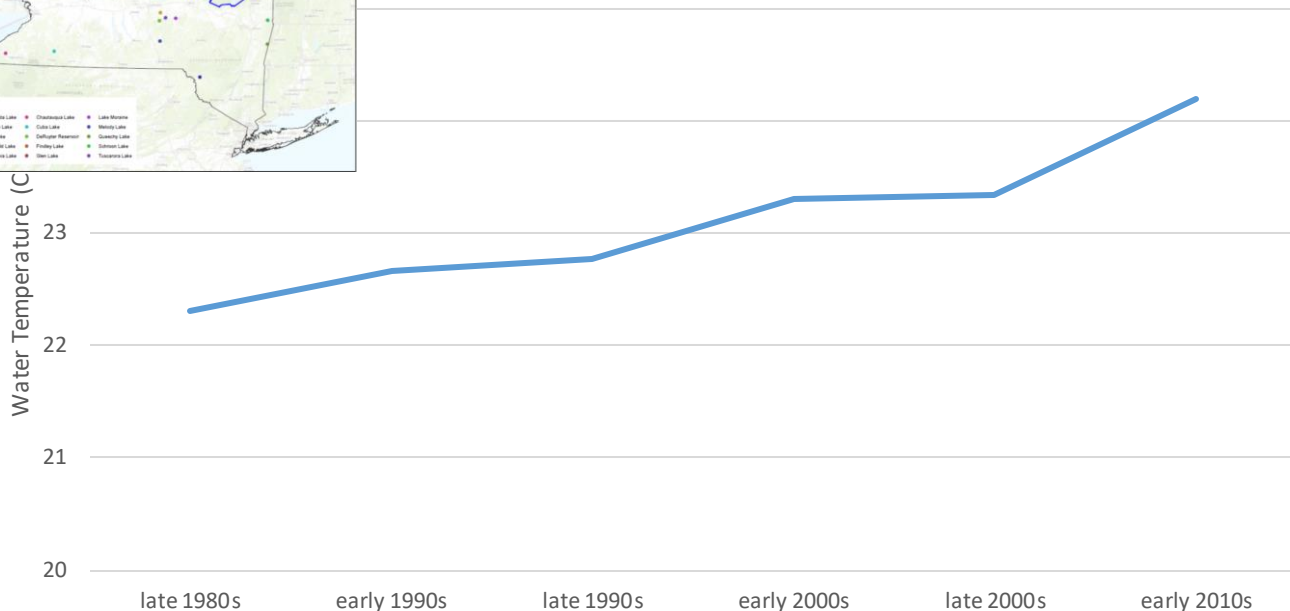
% Lakes w/ WaterT > 1SD Higher or Lower than Normal



Long term temperature changes in CSLAP lakes



Average Water Temp by Half Decade-
15 CSLAP Study Lakes



What else we are learning (slide 1 of 235,187)

Connection between eutrophication and lake perception

Relationship of native and exotic plants and weed coverage

Regional patterns in water quality and recreational assessments

Triggers for cyanobacteria blooms in New York state

Cyanotoxin production and cyanobacteria taxa

Connections between open water conditions and shore blooms

Ways to estimate internal nutrient loading in lakes

Impacts from algacides





The last word

I've cherished the opportunity to work with NYSFOLA, and thousands of CSLAP volunteers, in a job I've loved, with people I've respected, and advancing causes that I hope have made a difference in your lives.

I leave you in many good hands, but with a heavy heart.

Thank you for a magical and memorable 33 years!



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