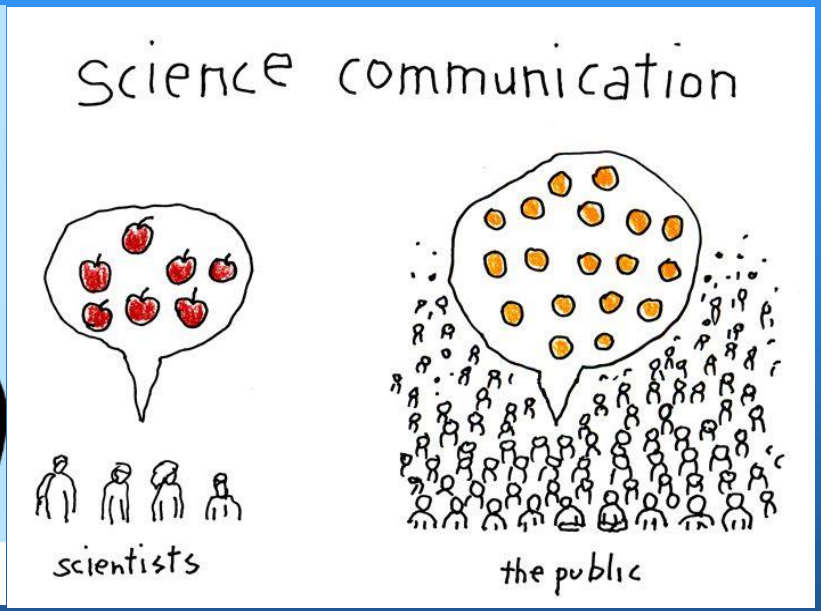
CSLAP: What Is the Data Used For?



Nancy Mueller, Manager
New York State Federation of Lake Associations
(800)796-3652
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Citizens Statewide Lake Assessment Program (CSLAP)

Established in 1985: NYS Environmental Conservation Law

§ 17-0305. Establishment of a program to monitor water quality by private citizens under the direction of the department.

`

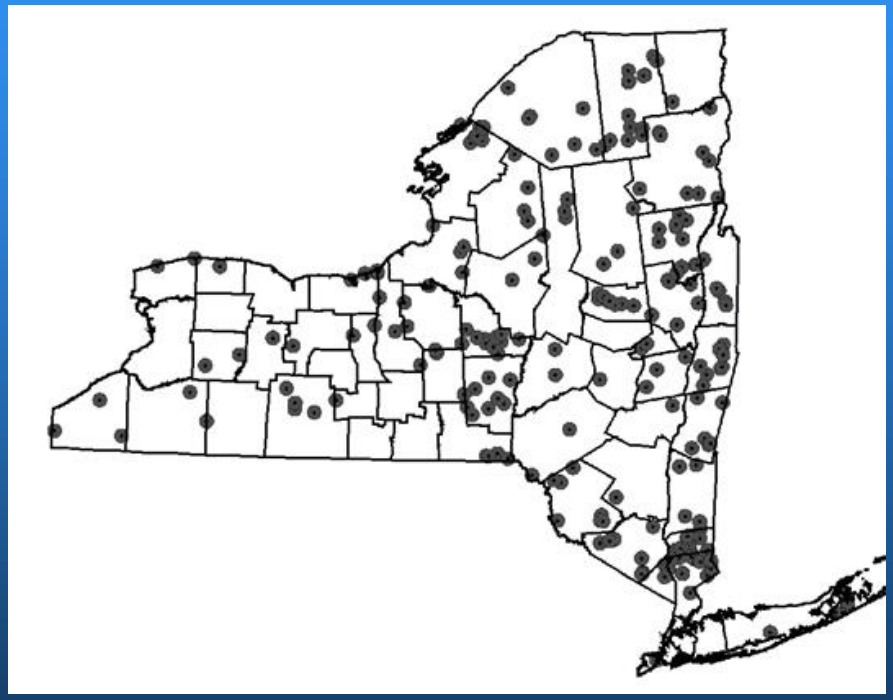
Citizens Statewide Lake Assessment Program (CSLAP)

1. The commissioner shall establish a program which shall be known as the "citizens statewide lake assessment program". **The purpose of this program is to establish a network of volunteers belonging to lake associations** throughout the state to monitor the condition of their respective lakes under the guidance and direction of the department.

What Volunteers Can Do!

1986-2018

- >70,000 samples
- >2500 volunteers
- >270 lakes across the state



What Data is Collected?

- Air & Water Temperature
- Lake Level (new)
- Secchi Transparency
- pH & Conductivity
- Nutrients
- Color
- Chlorophyll *a* and algae (2011-2018 including toxins)

CSLAP –Standard Parameters

- Water Temperature (field)
- Transparency (field)
- Conductivity (lab)
- pH (lab) and Ca (lab)
- (True) Color (field filter-lab)
- TP (lab), new! TDP
- Nitrogen (Total , ammonia, and NOx)(lab) new! TDN
- Chlorophyll a (field filter-lab)….chloride, calcium

CSLAP-Other Data Collection

- Air temperature
- Weather
- Lake Perception Form
- Health and Safety Observations
- Lake Management (harvesting, herbicides, dredging, etc.)
- Recreational Use
- Lake Level
- HABs

DEC Uses of CSLAP Data

Identifying statewide issues

- Algae blooms and Algal toxins
- Effects of lake stratification (oxygen, internal loading, metals) TP bottom sample, some years Fe, As, Mn
- Impact of nutrients and development of numeric nutrient criteria
- Distribution of invasive species

Assessing individual waterbodies

- PWL (Priority waterbody list – condition of waterbodies)

305b (WQ Assessments)

303d (impaired and TMDL development)

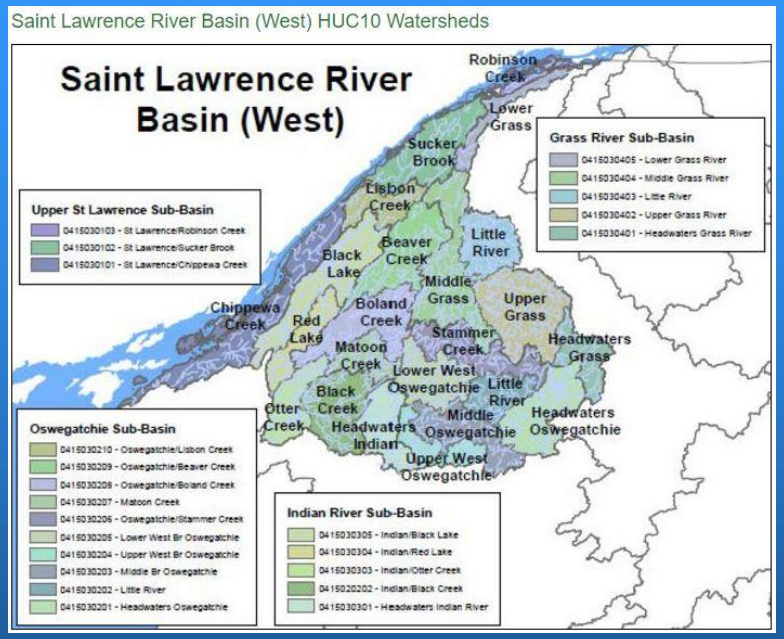
Surface Water Classifications

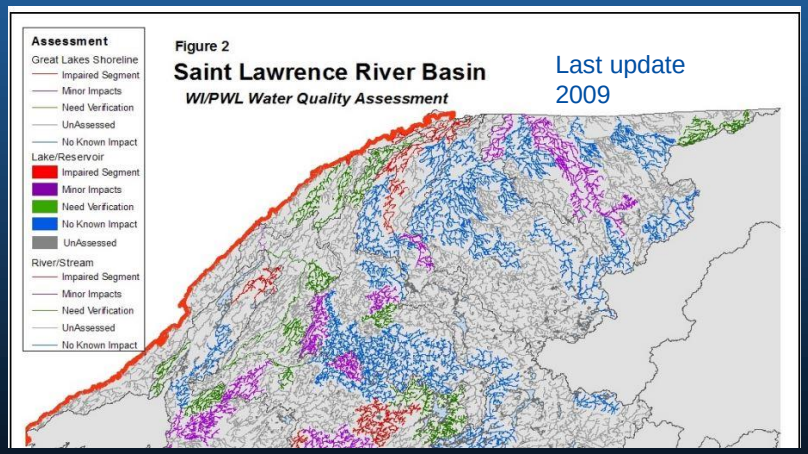
Class N, Class AA-Special (AA-S), Class A-Special (A-S), Class AA, Class A, Class B, Class C, Class D - Based on “highest use” of waterbody…drinking water (with or without treatment), recreational contact, food processing, fishing, fish/wildlife/shellfish propagation and survival.

https://govt.westlaw.com/nycrr/Browse/Home/NewYork/NewYorkCodesRulesandRegulations?guid=I06849fe0b5a111dda0a4e17826ebc834&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)&bhcp=1

Waterbody Inventory-PWL

- State inventory of waterbodies relative to waterbody uses
- Volunteer monitoring data intimately connected to waterbody uses
  - Water quality indicators chosen to assess uses
  - **Standardized lake perception data generated to evaluate uses**
  - Sampling volunteers are lake users and in position to identify use impacts (swimming, fishing, boating, etc.)
- CSLAP data heavily used in PWL evaluations
  - www.dec.ny.gov/chemical/36735.html





Waterbody Inventory-PWL- Lake OK

Lake of the Woods (0906-0038) **NoKnownImpct**

Waterbody Location Information Revised: 11/13/2008

Water Index No:	SL-25- 7/P1- 3-17-P 9			**Drain Basin:**	Saint Lawrence River
Hydro Unit Code:	04150303/060	**Str Class:**	C		Indian River
Waterbody Type:	Lake			**Reg/County:**	6/Jefferson Co. (23)
Waterbody Size:	168.4 Acres			**Quad Map:**	FORESTPORT (H-20-1)
Seg Description:	entire lake				

Water Quality Problem/Issue Information (CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	**Severity**	**Problem Documentation**
NO USE IMPAIRMNT		

Type of Pollutant(s)

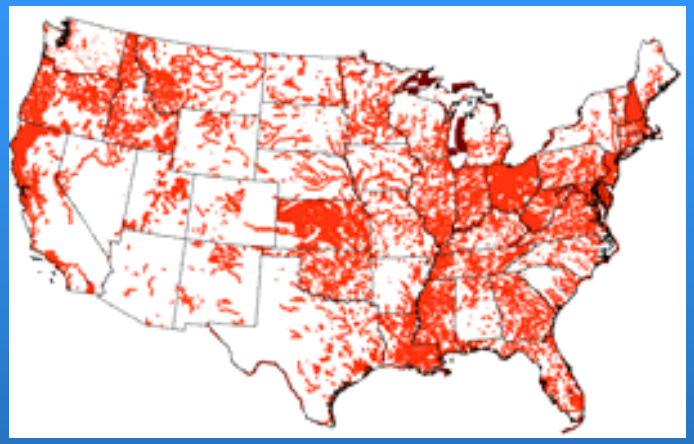
Known:	- - -
Suspected:	- - -
Possible:	- - -

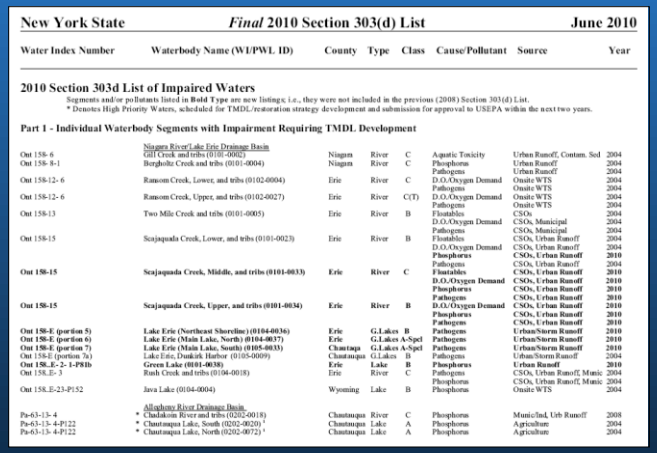
Further Details

Water Quality Sampling

Lake of the Woods has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 1994 and most recently from 1999 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 oligotrophic, or highly unproductive. Indications of higher productivity in the most recent sampling year is likely within the range of natural variability. Phosphorus levels in the lake fall well below the state guidance values indicating impacted/stressed recreational uses. Corresponding transparency measurements significantly exceed what is the recommended minimum for swimming beaches. Measurements of pH typically fall within the state water quality range of 6.5 to 8.5. The lake water is weakly colored, but color does not limit water transparency. (DEC/DOW, BWAM/CSLAP, June 2006)

303d List- Not so Good





New York State — *Final* 2010 Section 303(d) List — June 2010

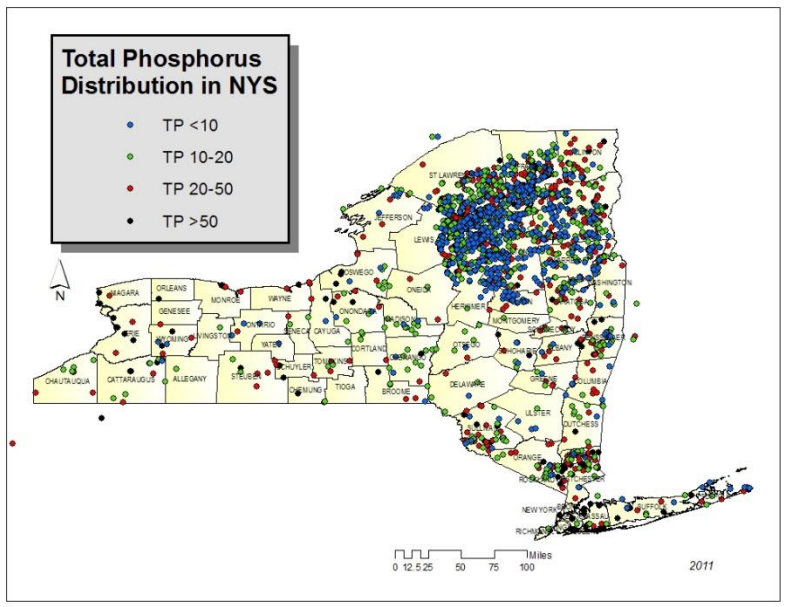
Water Index Number	Waterbody Name (WI/PWL ID)	County	Type	Class	Cause/Pollutant	Source	Year
2010 Section 303d List of Impaired Waters							
Segments and/or pollutants listed in **Bold Type** are new listings; i.e., they were not included in the previous (2008) Section 303(d) List.							
* Denotes High Priority Waters, scheduled for TMDL/restoration strategy development and submission for approval to USEPA within the next two years.							
Part 1 - Individual Waterbody Segments with Impairment Requiring TMDL Development							
	Niagara River/Lake Erie Drainage Basin						
Ont 158- 6	Gill Creek and tribs (0101-0002)	Niagara	River	C	Aquatic Toxicity	Urban Runoff, Contam. Sed	2004
Ont 158- 8-1	Bergholtz Creek and tribs (0101-0004)	Niagara	River	C	Phosphorus	Urban Runoff	2004
					Pathogens	Urban Runoff	2004
Ont 158-12- 6	Ransom Creek, Lower, and tribs (0102-0004)	Erie	River	C	D.O./Oxygen Demand	Onsite WTS	2004
					Pathogens	Onsite WTS	2004
Ont 158-12- 6	Ransom Creek, Upper, and tribs (0102-0027)	Erie	River	C(T)	D.O./Oxygen Demand	Onsite WTS	2004
					Pathogens	Onsite WTS	2004
Ont 158-13	Two Mile Creek and tribs (0101-0005)	Erie	River	B	Floatables	CSOs	2004
					D.O./Oxygen Demand	CSOs, Municipal	2004
					Pathogens	CSOs, Municipal	2004
Ont 158-15	Scajaquada Creek, Lower, and tribs (0101-0023)	Erie	River	B	Floatables	CSOs, Urban Runoff	2004
					D.O./Oxygen Demand	CSOs, Urban Runoff	2004
					Phosphorus	**CSOs, Urban Runoff**	**2010**
					Pathogens	CSOs, Urban Runoff	2004
Ont 158-15	**Scajaquada Creek, Middle, and tribs (0101-0033)**	**Erie**	**River**	**C**	**Floatables**	**CSOs, Urban Runoff**	**2010**
					D.O./Oxygen Demand	**CSOs, Urban Runoff**	**2010**
					Phosphorus	**CSOs, Urban Runoff**	**2010**
Ont 158-15	**Scajaquada Creek, Upper, and tribs (0101-0034)**	**Erie**	**River**	**B**	**D.O./Oxygen Demand**	**CSOs, Urban Runoff**	**2010**
					Phosphorus	**CSOs, Urban Runoff**	**2010**
					Pathogens	**CSOs, Urban Runoff**	**2010**
Ont 158-E (portion 5)	**Lake Erie (Northeast Shoreline) (0104-0036)**	**Erie**	**G.Lakes**	**B**	**Pathogens**	**Urban/Storm Runoff**	**2010**
Ont 158-E (portion 6)	**Lake Erie (Main Lake, North) (0104-0037)**	**Erie**	**G.Lakes**	**A-Spcl**	**Pathogens**	**Urban/Storm Runoff**	**2010**
Ont 158-E (portion 7)	**Lake Erie (Main Lake, South) (0105-0033)**	**Chautaqa**	**G.Lakes**	**A-Spcl**	**Pathogens**	**Urban/Storm Runoff**	**2010**
Ont 158-E (portion 7a)	Lake Erie, Dunkirk Harbor (0105-0009)	Chautauqua	G.Lakes	B	Pathogens	Urban/Storm Runoff	2004
Ont 158..E- 2- 1-P81b	**Green Lake (0101-0038)**	**Erie**	**Lake**	**B**	**Phosphorus**	**Urban Runoff**	**2010**
Ont 158..E- 3	Rush Creek and tribs (0104-0018)	Erie	River	C	Pathogens	CSOs, Urban Runoff, Munic	2004
					Phosphorus	CSOs, Urban Runoff, Munic	2004
Ont 158..E-23-P152	Java Lake (0104-0004)	Wyoming	Lake	B	Phosphorus	Onsite WTS	2004
	Allegheny River Drainage Basin						
Pa-63-13- 4	* Chadakoin River and tribs (0202-0018)	Chautauqua	River	C	Phosphorus	Munic/Ind, Urb Runoff	2008
Pa-63-13- 4-P122	* Chautauqua Lake, South (0202-0020) [1]	Chautauqua	Lake	A	Phosphorus	Agriculture	2004
Pa-63-13- 4-P122	* Chautauqua Lake, North (0202-0072) [1]	Chautauqua	Lake	A	Phosphorus	Agriculture	2004

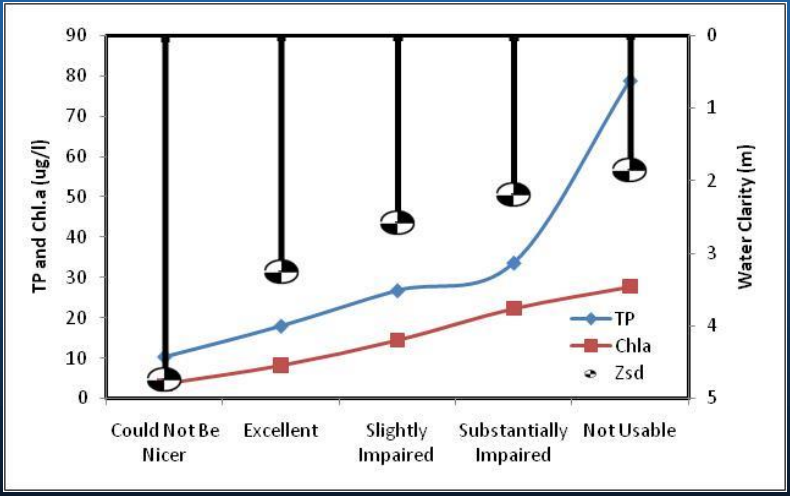
- "Impaired" or "Precluded" waters cited on the WI-PWL list in NYS
- "Impaired water" list intended to require evidence of impaired uses
- Many water quality or waterbody monitoring programs do not evaluate uses
- Many programs do not have sufficient data to conduct TMDL/post-TMDL monitoring
- CSLAP data set used to identify 303d candidates (water quality data and use evaluation) and could be used for post-TMDL monitoring requirements
- **Appx. 50% of all nutrient 303d sites in NYS identified through CSLAP**

Someday……NNC= Numeric Nutrient Criteria instead of “Guidance Values”

CSLAP data figures prominently in the (eventual) development of numeric nutrient criteria (NNC)

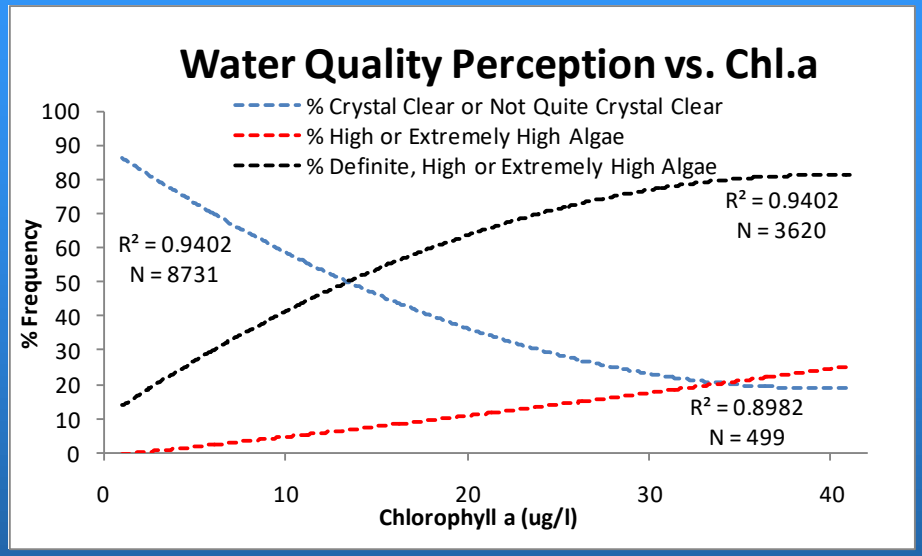
- TP, chl.a, water clarity distribution in NYS
- Relationship between NNC indicators and lake perception
- Relationship between NNC and algal toxins





What does CSLAP tell us about algae blooms?

- CSLAP perception data evaluates various levels of algae (question A)
- At chl a levels of about 15 ug/l, lakes are equally likely to be described as “crystal clear” or “not quite crystal clear” or “having definite algae greenness”
- At chl a levels of 20 ug/l, lakes described as having “high algae levels” more than 10% of the time
- Individual lakes “(mis)behave” differently (Skaneateles, for example)

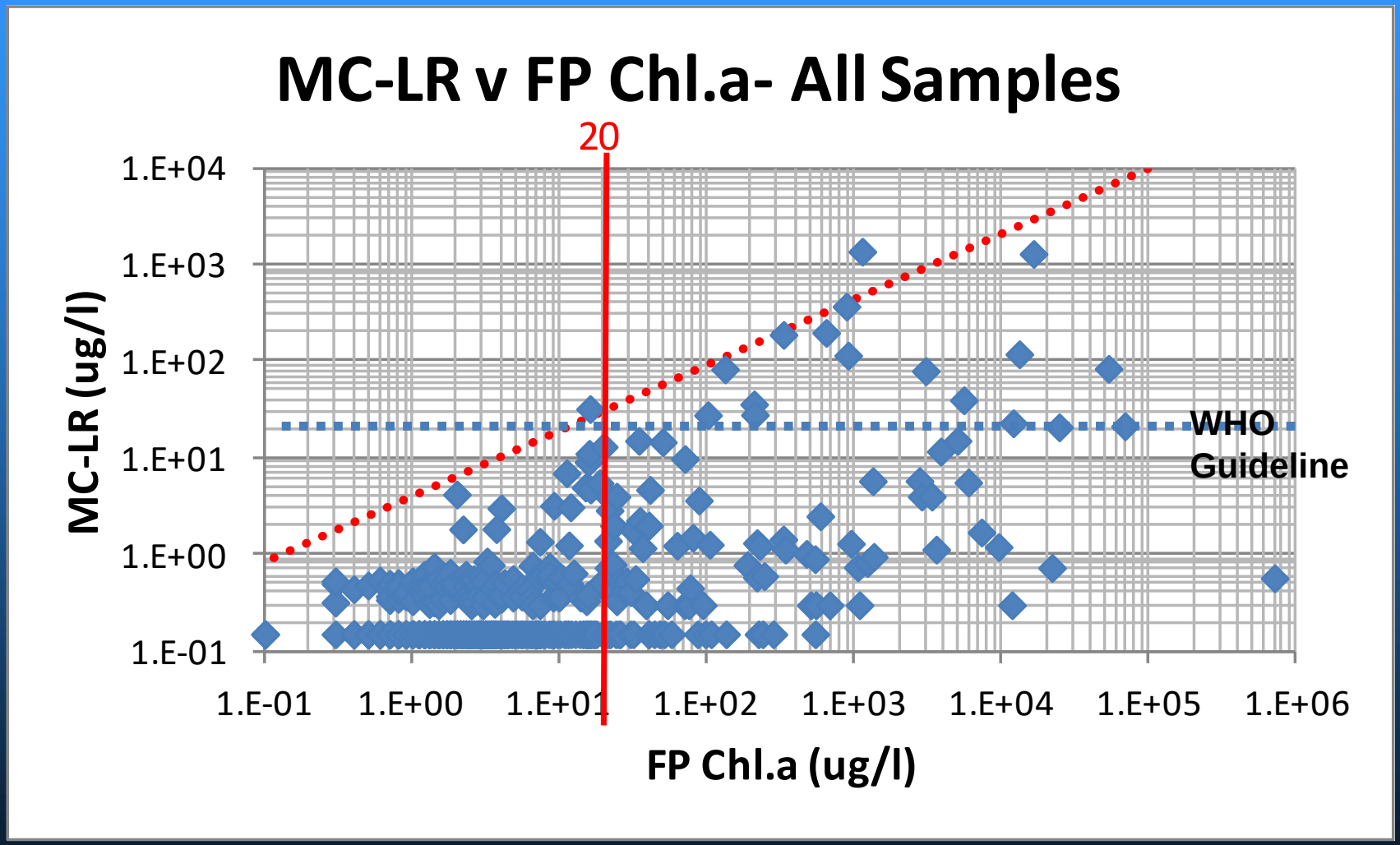


Note- regression lines are best-fit second order polynomials from 2 ug/l chl.a frequency intervals

(A) PLEASE CIRCLE THE ONE NUMBER THAT BEST DESCRIBES THE PHYSICAL CONDITION OF THE LAKE WATER TODAY:

1. Crystal clear water
2. Not quite crystal clear- a little algae visible
3. Definite algae greenness, yellowness, or browness apparent
4. High algae levels with limited clarity and/or mild odor apparent
5. Severely high algae levels with one or more of the following: massive floating scums or streaks on lake or washed up on shore, strong foul odor, fish kills

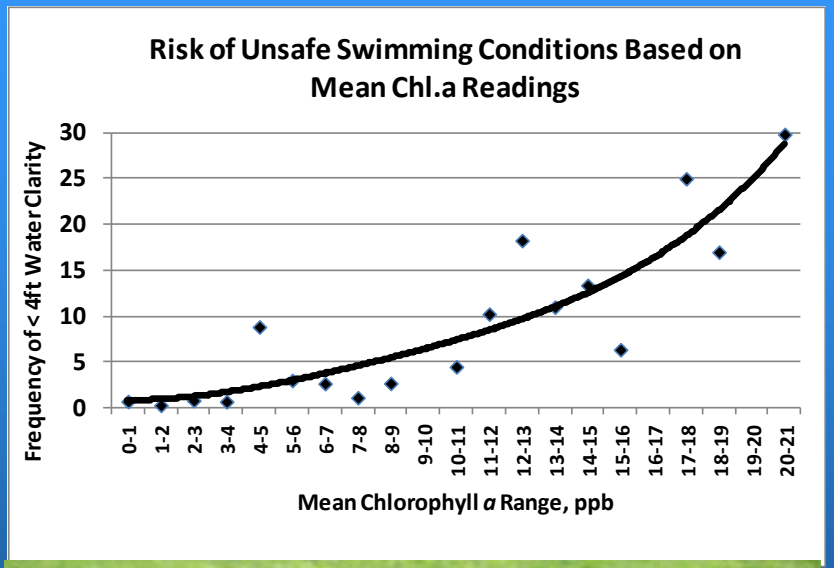
Algal Toxins and Chl a



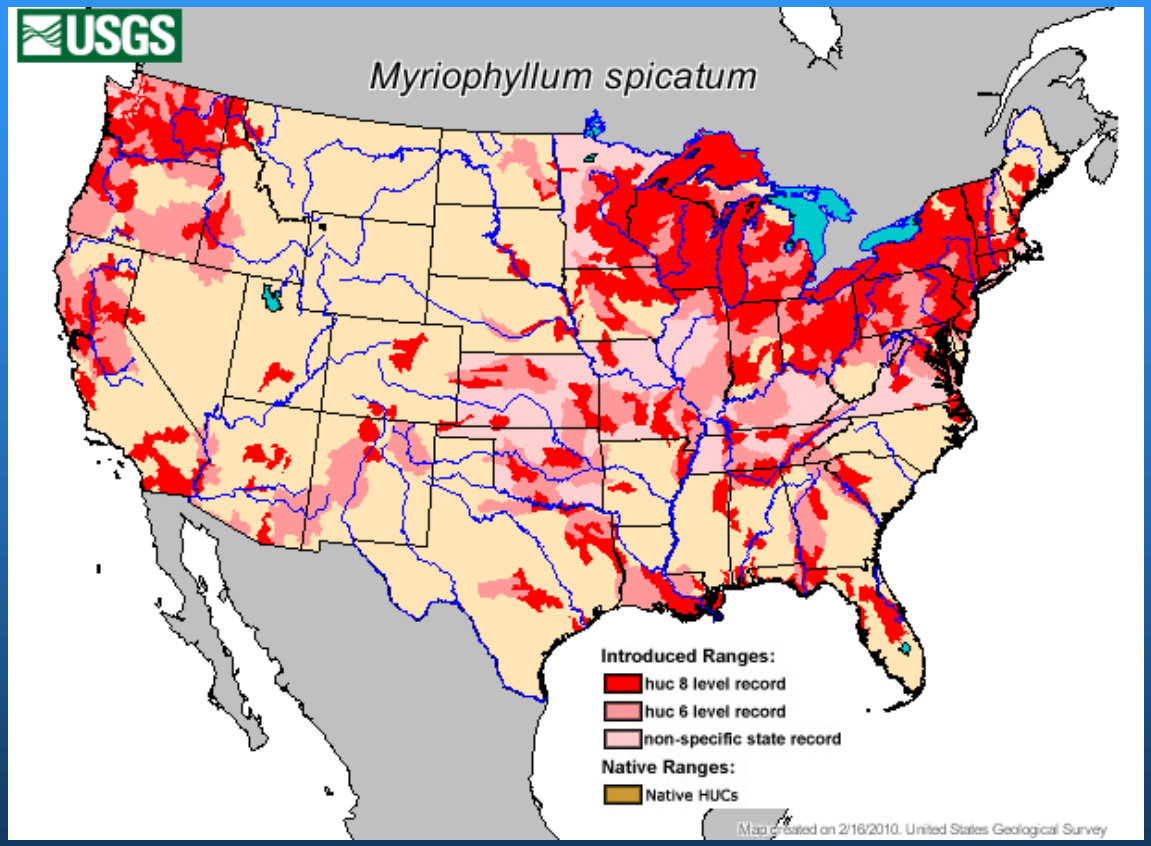
Recreational Impacts from Compromised Safety of Swimmers

New York State Sanitary Code Section 6-2.19.4.11.3 Physical Quality--Water Clarity states that:

- *In all bathing areas, except the Great Lakes or ocean beaches, it shall be possible to see an eight-inch black-and-white disk in four feet of water*
- Criteria should be established to minimize the occurrence of 4 feet (= 1.2 meters) of water clarity
- Conditional probability analysis comparing mean chlorophyll *a* against frequency of 4ft water clarity readings allow for choice of acceptable risk of unsafe conditions



Beyond Nutrients - Where are Aquatic Invasive Species in NY?



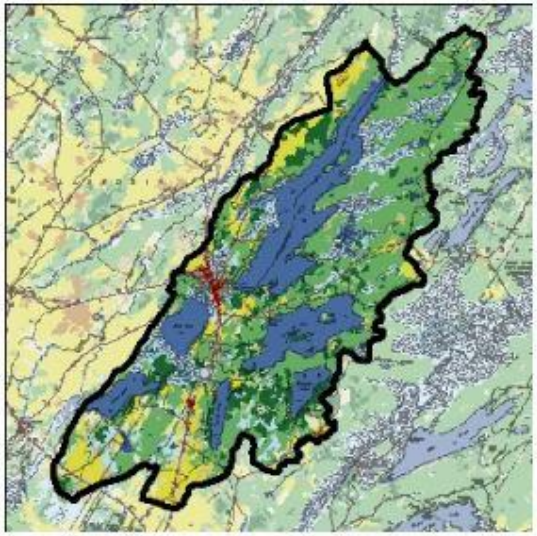
Road Salt Impacts

- A 2014 study of Lake George by the Darrin Fresh Water Institute showed a nearly three-fold increase over the course of three decades in the level of salt. **The Lake George Association's Citizen Science Lake Assessment Program, too, has shown increases in salt and temperature readings.**

- GWENDOLYN CRAIG Glens Falls Post Star and Adirondack Daily Enterprise Staff Jun 4, 2018

What Does Your CSLAP Report Tell You About Your Lake?

Butterfield Lake	Butterfield Lake Cottage Owners' Association	Town of Redwood	Jefferson County



Lake Characteristics	Surface area (ac/ha)	1005 / 407
	Max depth (ft/m)	48 / 15
	Mean depth (ft/m)	14 / 3
	Retention time (years)	2.3
	Lake Classification	B
	Dam Classification	0
Watershed Characteristics	Watershed area (ac /ha)	4250/1720
	Watershed / Lake ratio	4
	Lake & wetlands %	35%
	Agricultural %	10%
	Forest, shrub, grasses %	53%
	Residential	3%
	Urban	0%
CSLAP Participation	Years	1986-2010, 2012-2016
	Volunteers	Walter Dutcher, Joseph Pasquini

Trophic state	**HABs Susceptibility**	**Invasive Vulnerability**	**PWL Assessment**
Mesoeutrophic	Frequent blooms, Moderate Susceptibility	Invasives present, High Vulnerability	Stressed

What Does Your CSLAP Report Tell You About Your Lake? (Millsite Lake)

Water quality values for Millsite Lake for the 2016 sampling season. "Seasonal change" shows current year variability. Light red color indicates eutrophic conditions in top table and bloom conditions in bottom table.

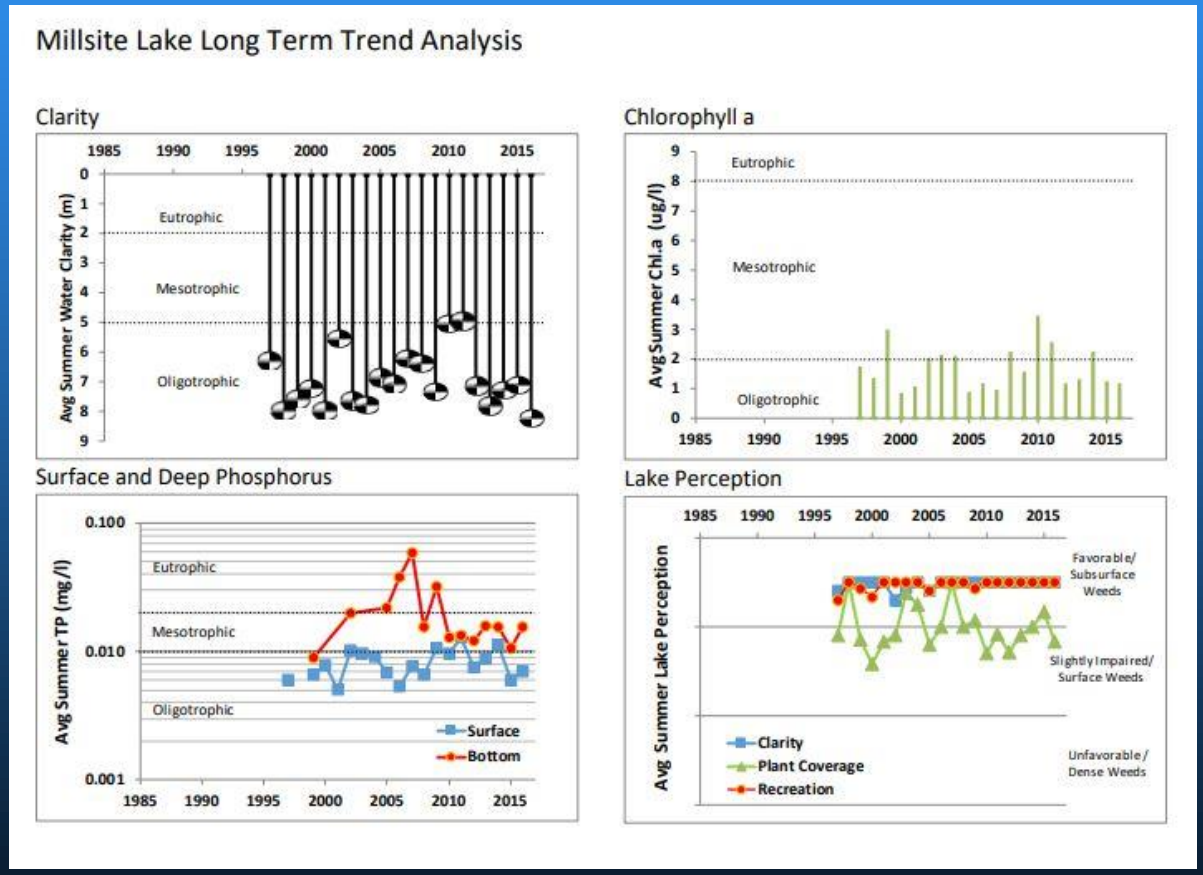
Open Water Indicators	2016 Sampling Results								Seasonal change	Long Term Avg	Long Term Trend?
	7/5	7/17	7/31	8/14	8/29	9/11					
Clarity (m)	8.0	8.0	8.0	7.9	8.8	8.5				6.8	no
TP (mg/l)	0.006	0.007	0.009	0.007	0.006	0.007				0.008	no
Deep TP (mg/l)	0.015	0.020	0.016	0.015	0.013	0.015				0.024	no
TN (mg/l)	0.241	0.382	0.239	0.357	0.236	0.239				0.384	no
N:P Ratio	42	53	27	53	37	33				46	no
Chl.a (ug/l)	0.9	1.0	0.8	1.5	1.9	1.0				1.9	no
pH	8.0	7.7	7.6	7.7	8.4	8.2				7.8	no
Cond (umho/cm)	94	88	72	73	79	101				91	no
Upper Temp (degC)	21	23	22	24	22	19				21	↓
Deep Temp (degC)	5	5	5	5	6	5				7	↓↓
BG Chl.a (ug/l)	0	0	0	0	0	0				1	no
HABs reported?	no	no	no	no	no	no					

Shoreline bloom and HABs notifications

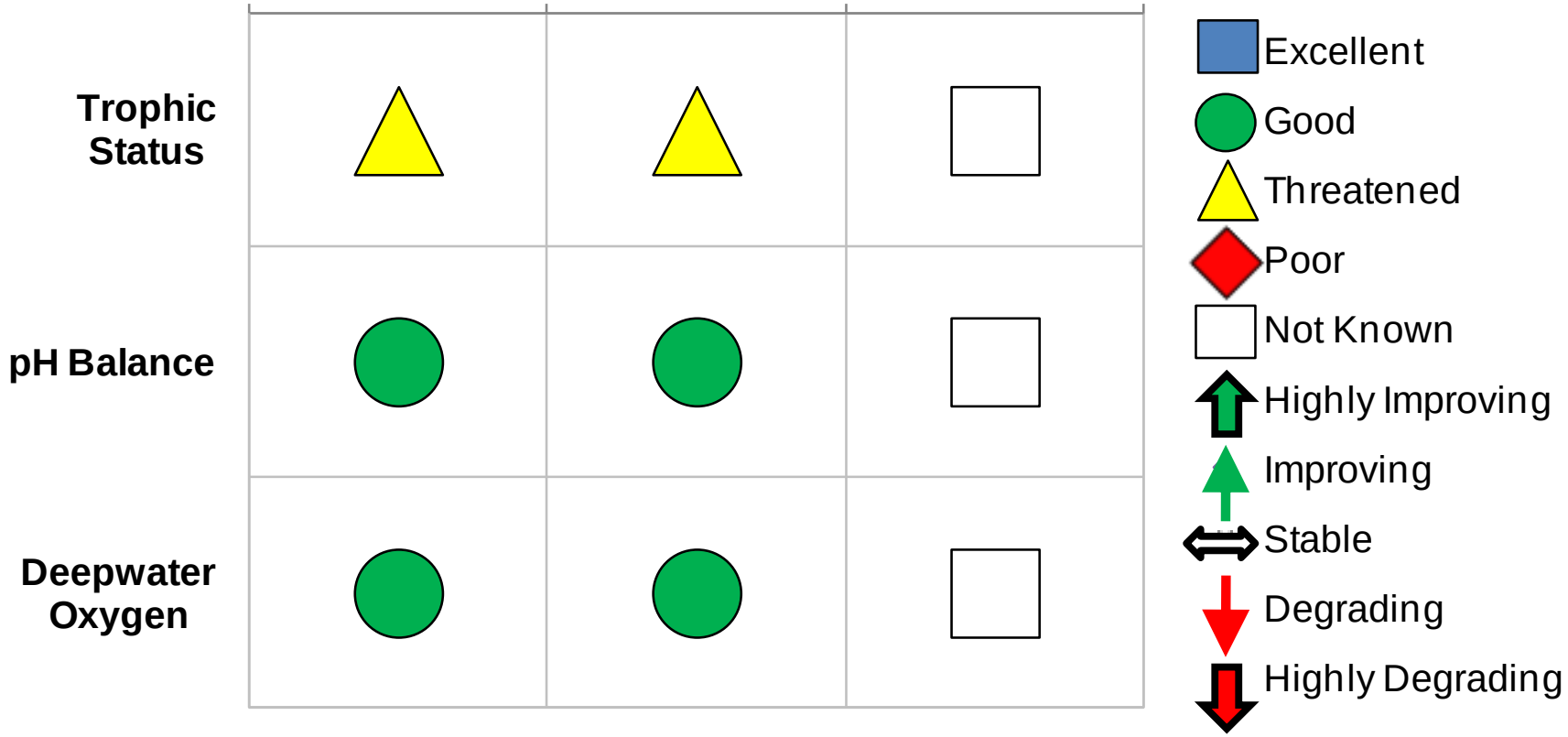
Date of first listing	Date of last listing	# weeks on the DEC notification list	# Weeks with updates

		Shoreline HAB sample dates 2016
HAB Indicators	**HAB criteria**	No shoreline HABs samples 2016
BGA	25 - 30 ug/L	
microcystin	20 ug/L	
anatoxin - a	4 ug/L	

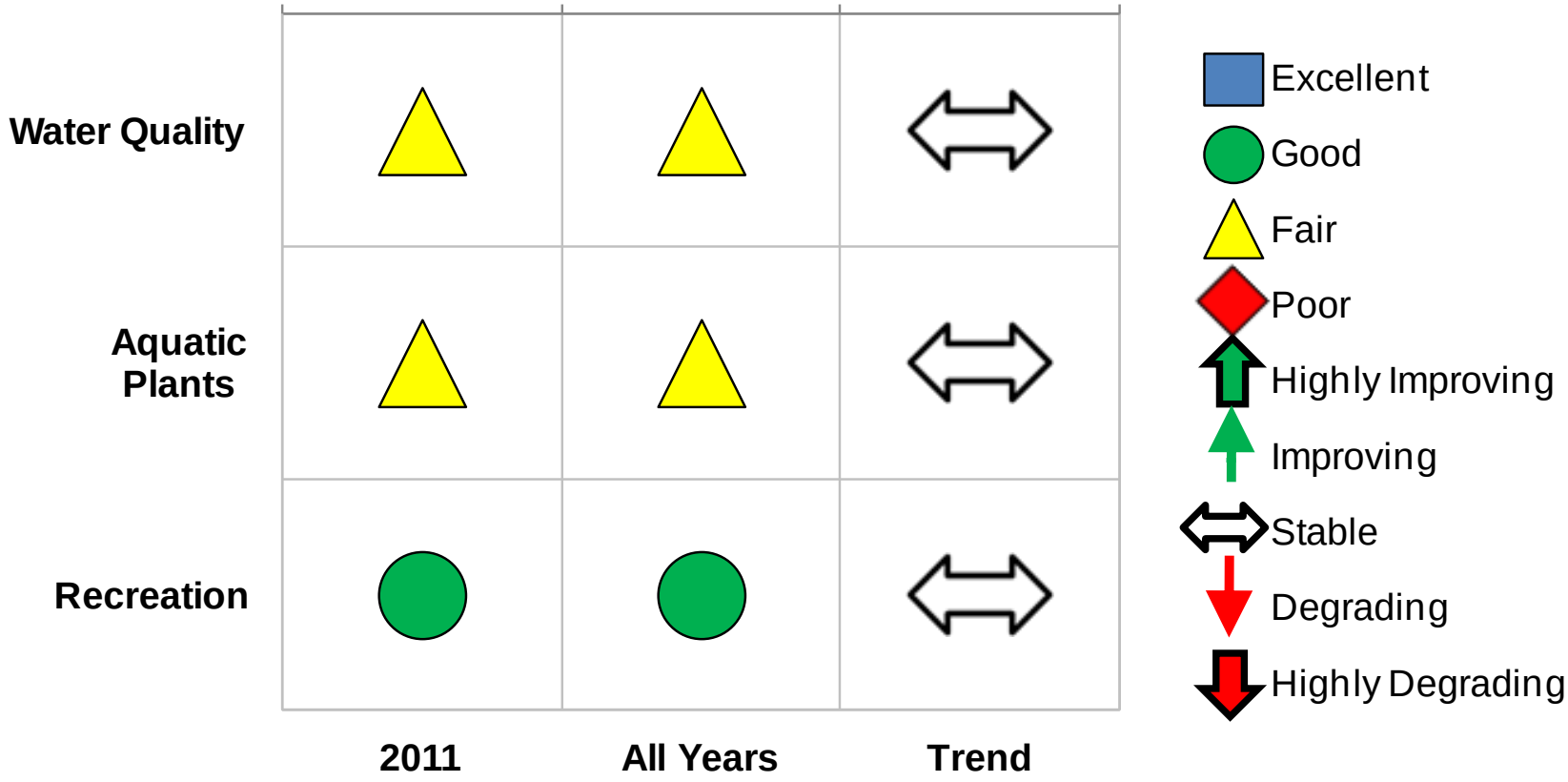
What Does Your CSLAP Report Tell You About Your Lake? (Millsite Lake)



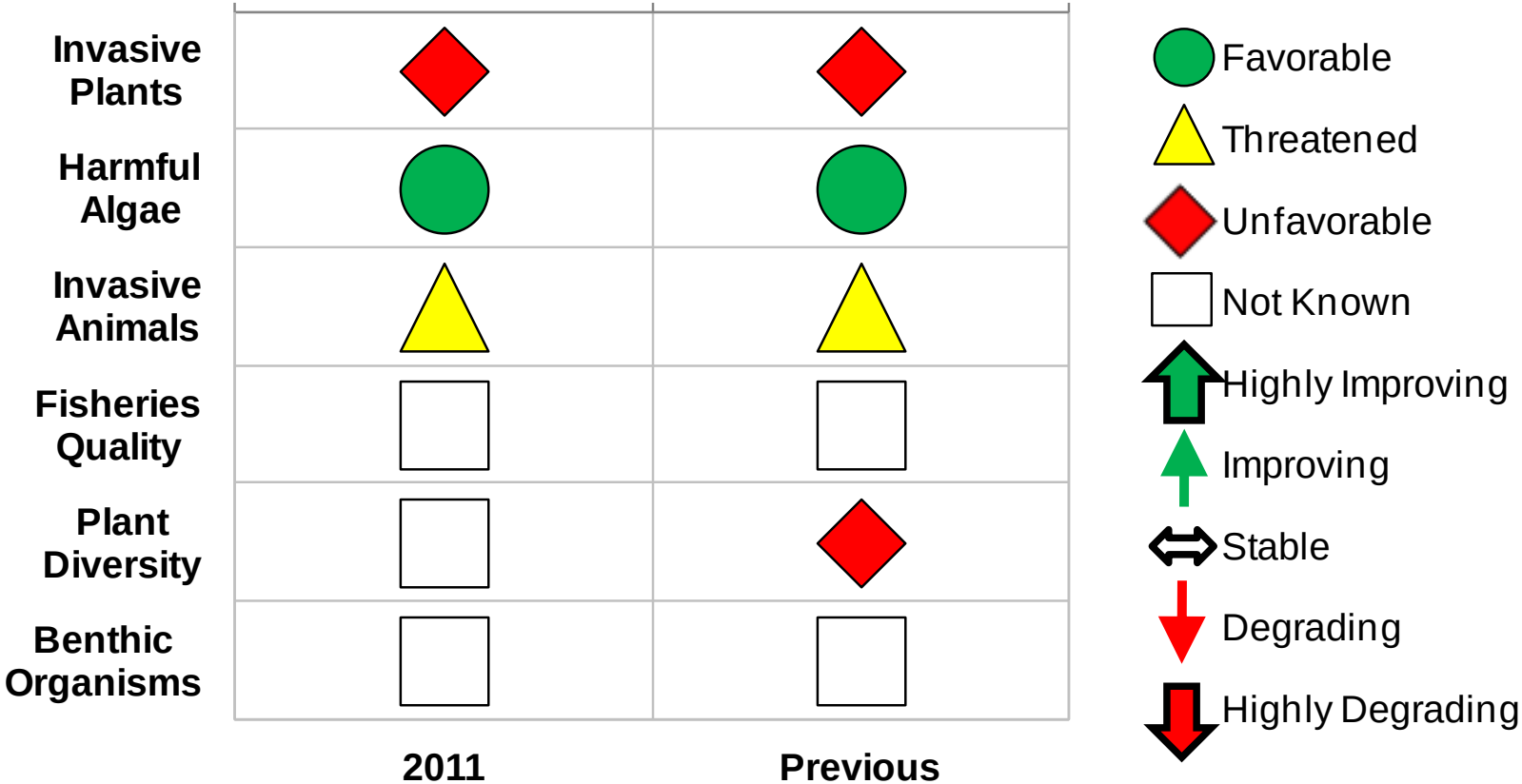
Water Quality



Lake Perception



Biological Health



Lake association use of CSLAP data

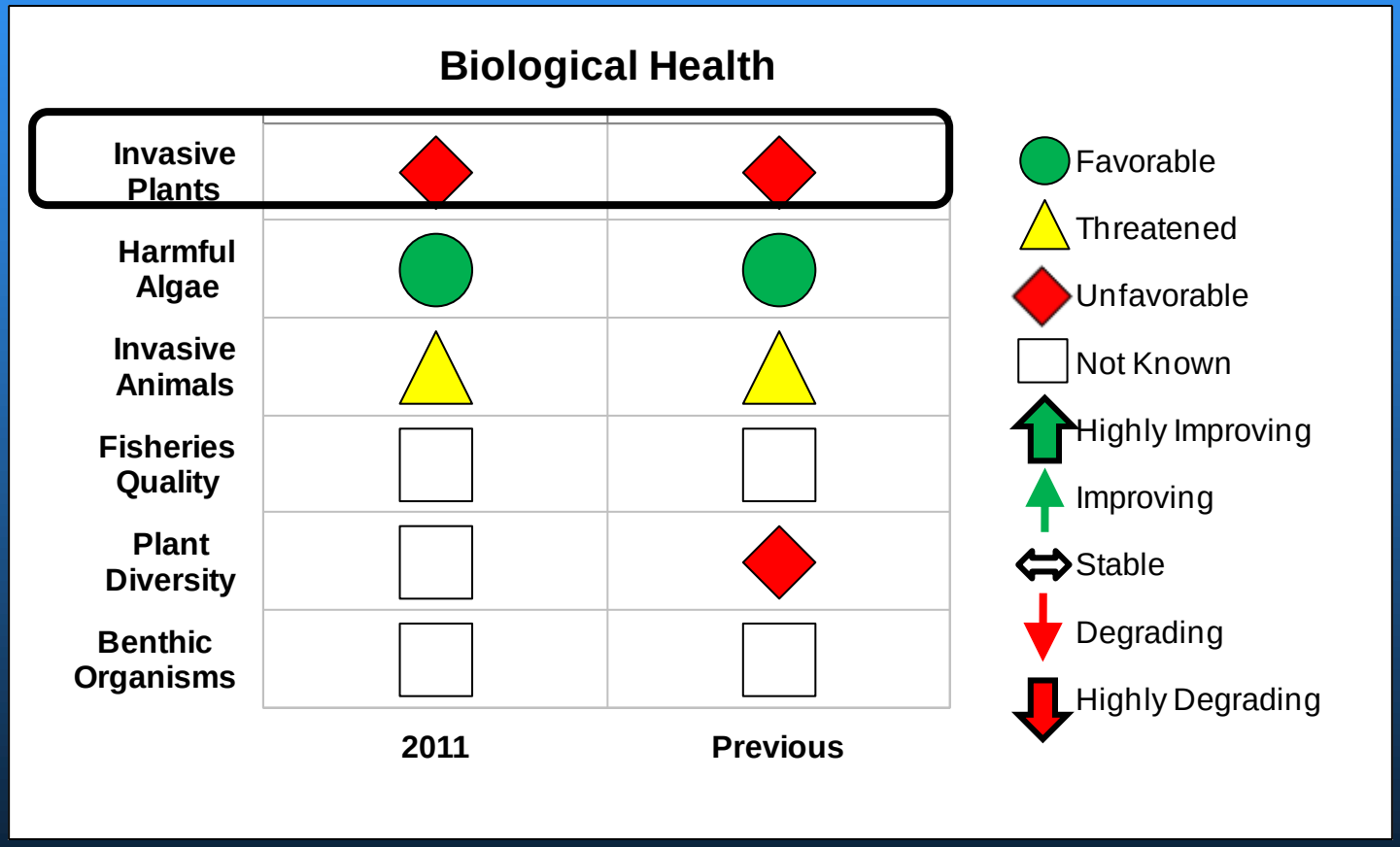
How to focus management actions

- Susceptibility to zebra mussels? (Ca)
- Need for plant management?
  - Impact of plants on non-contact recreation
  - Location of AIS in nearby lakes
- Need for runoff/stormwater control
- Shoreline BMPs?

Evaluate specific management actions

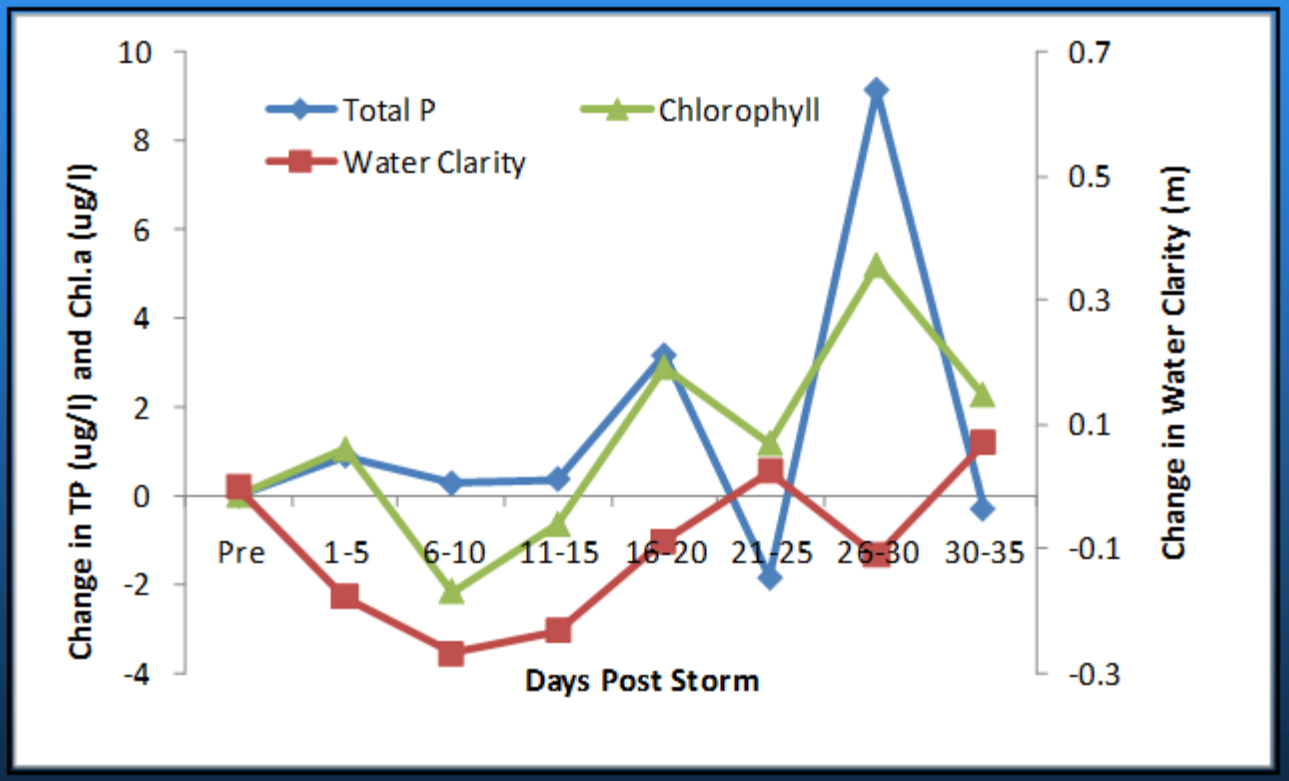
- Copper sulfate/algacides
- Aquatic plant management actions
- Watershed/septic/nutrient management actions (or inactions)

Susceptibility to Invasive Plants



Runoff Control: How does weather affect NYS lakes?

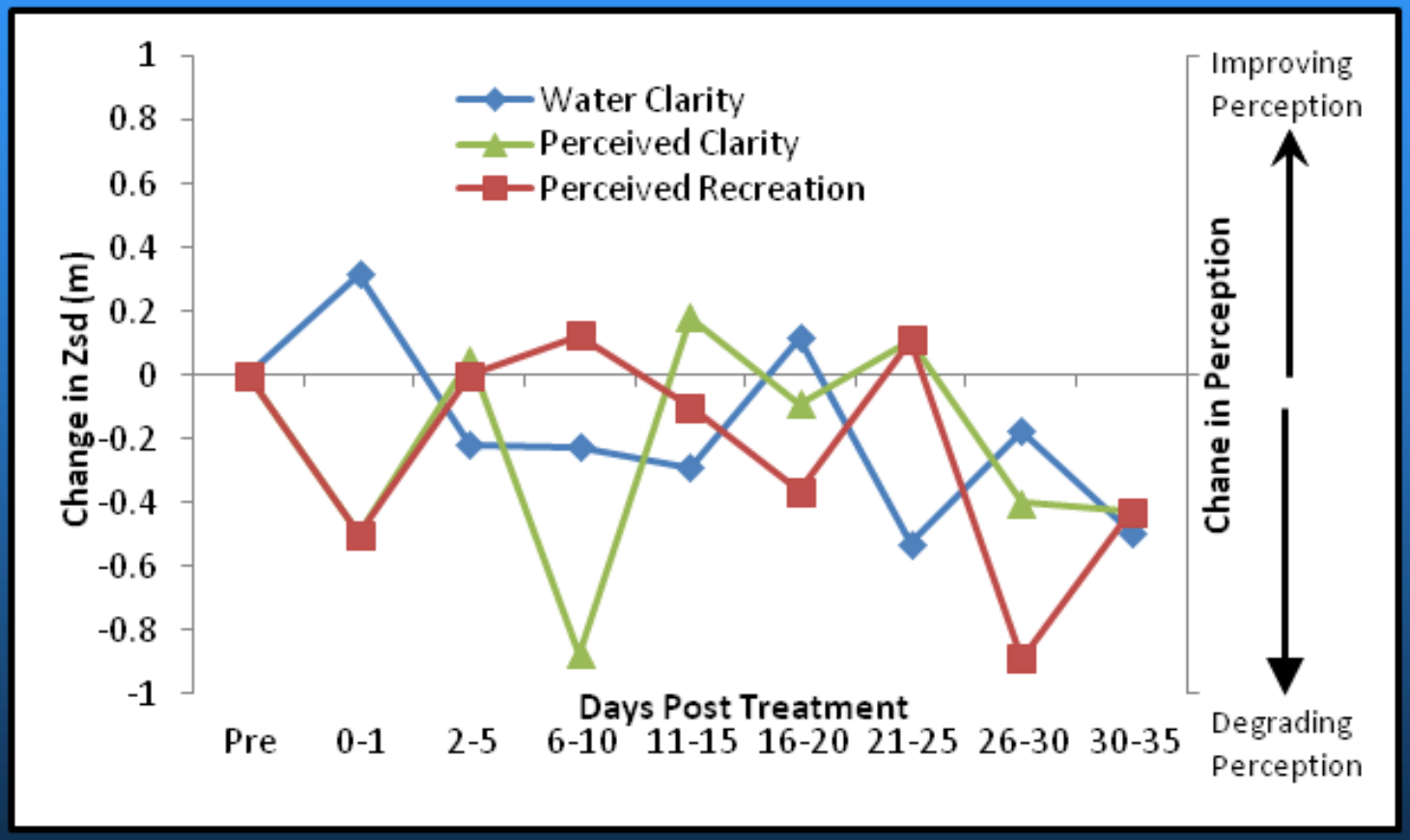
What happens after storm events?



Storms are defined here as exceeding 1" in previous day or 2" within the last three days (for overlapping storms)

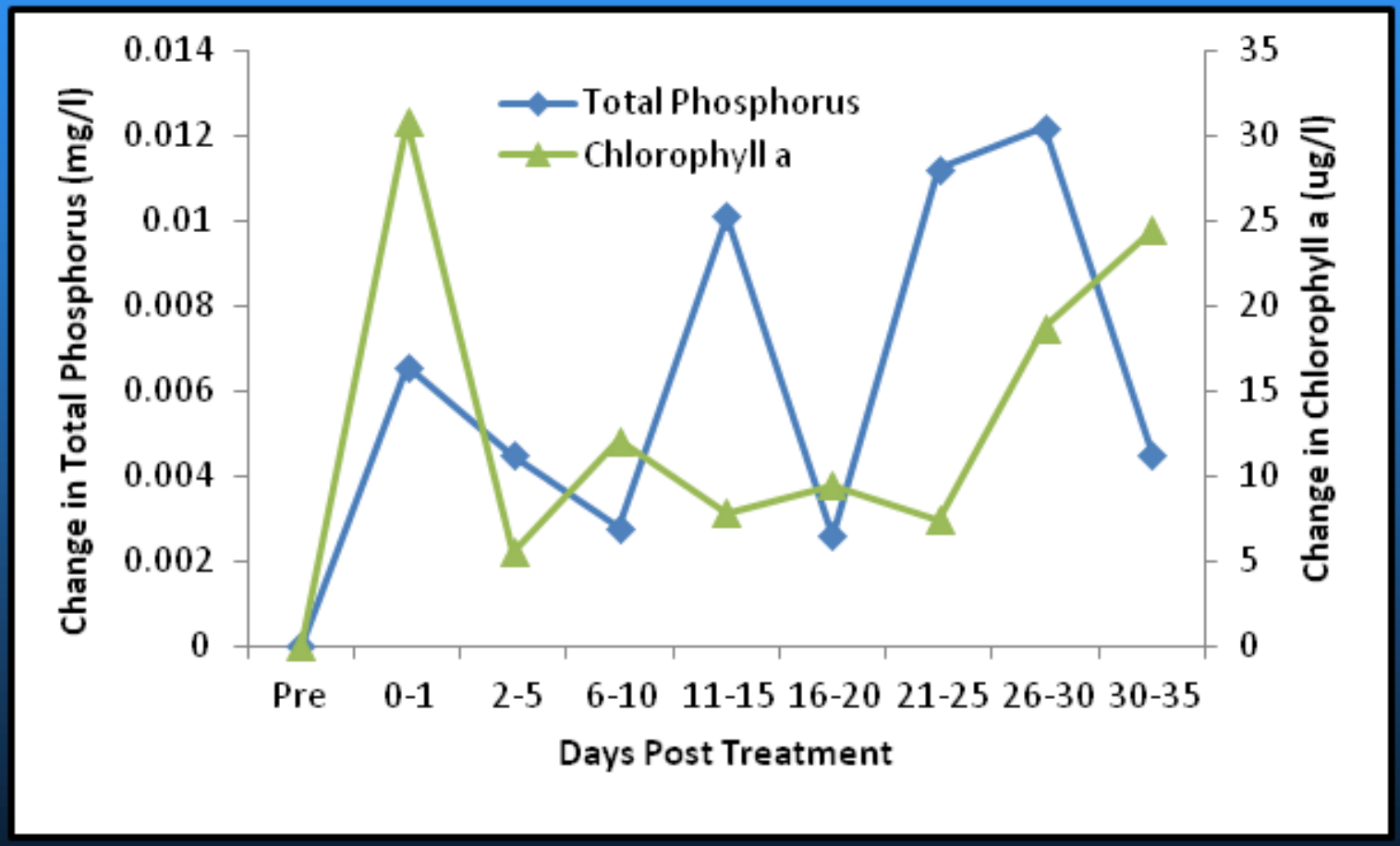
- Storm effects confounded by normal seasonal changes
- Water clarity changes likely attributable to turbidity

Evaluating Lake Management Actions- How Well Do Algacides Work?

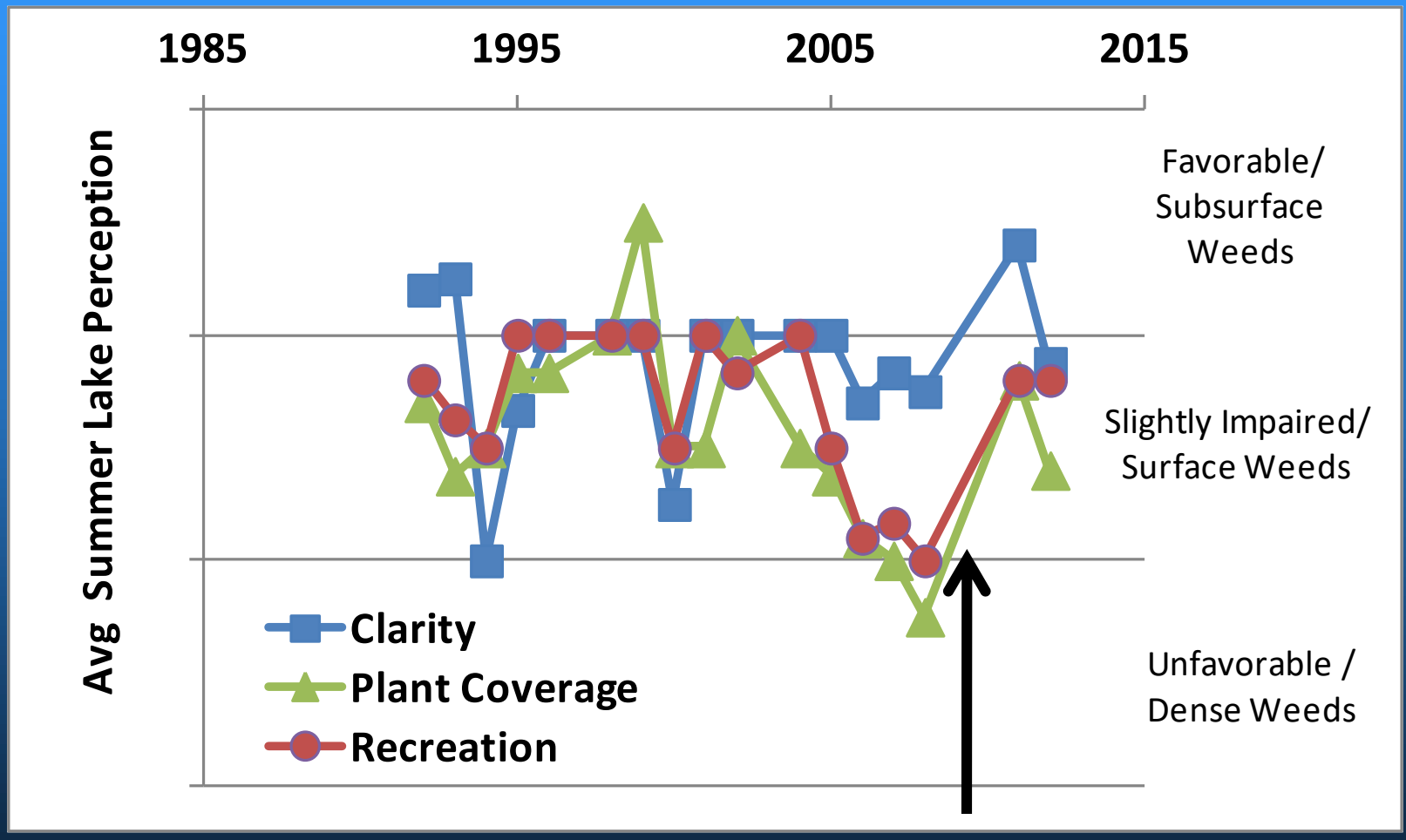


(data from 14 CSLAP lakes)

Evaluating Lake Management Actions- How Well Do Algacides Work?

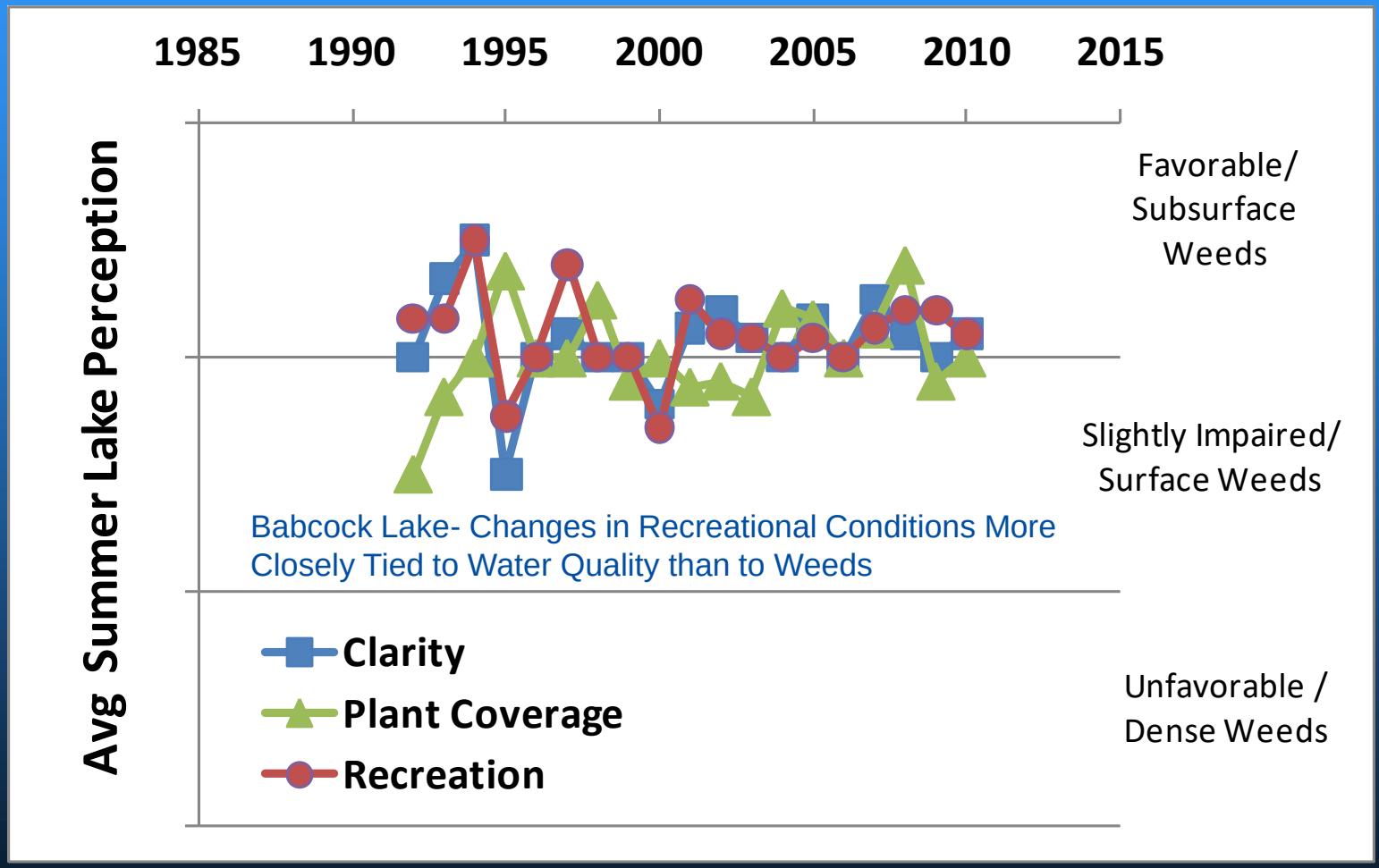


Evaluating Lake Management Actions- Plant Management



Cazenovia Lake- 2009 herbicide treatment

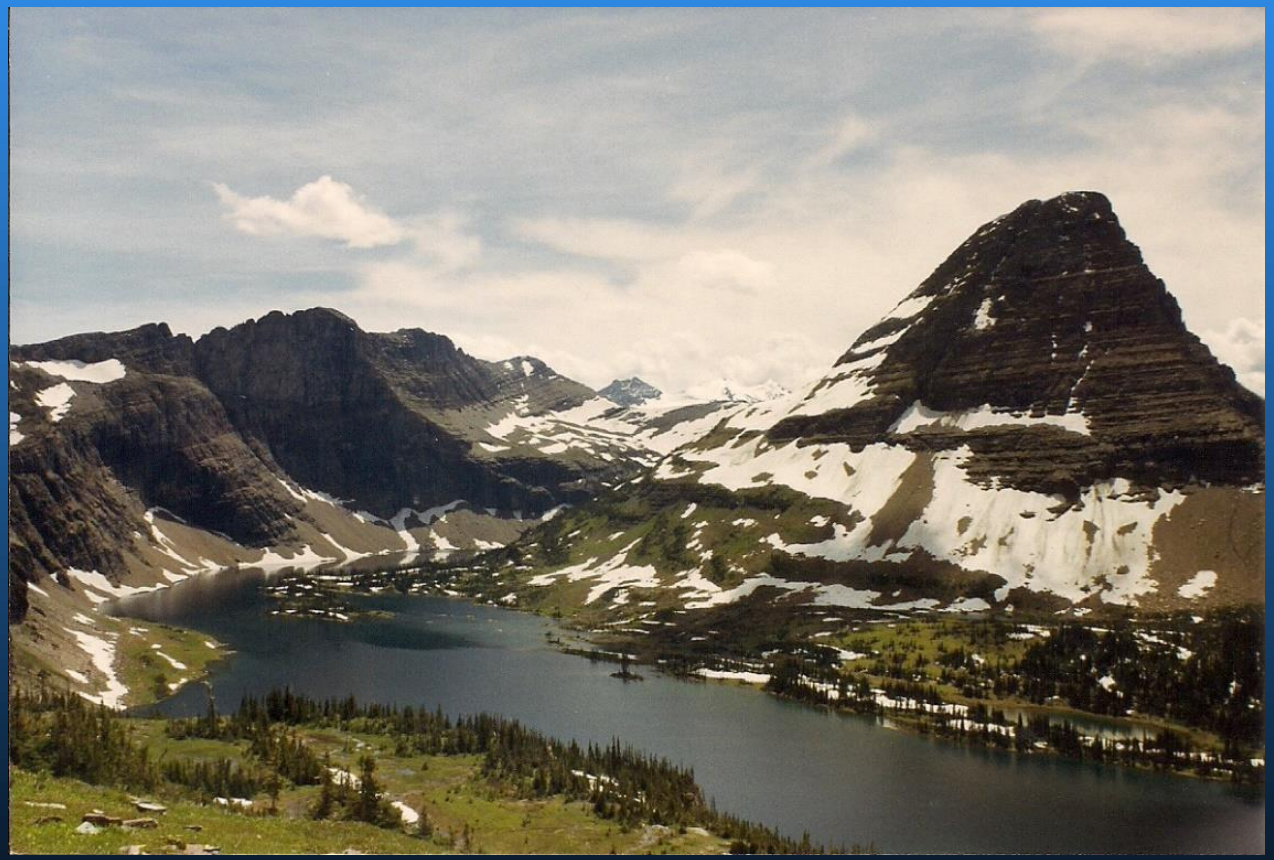
Evaluating Lake Management Actions- Recreational "Management"



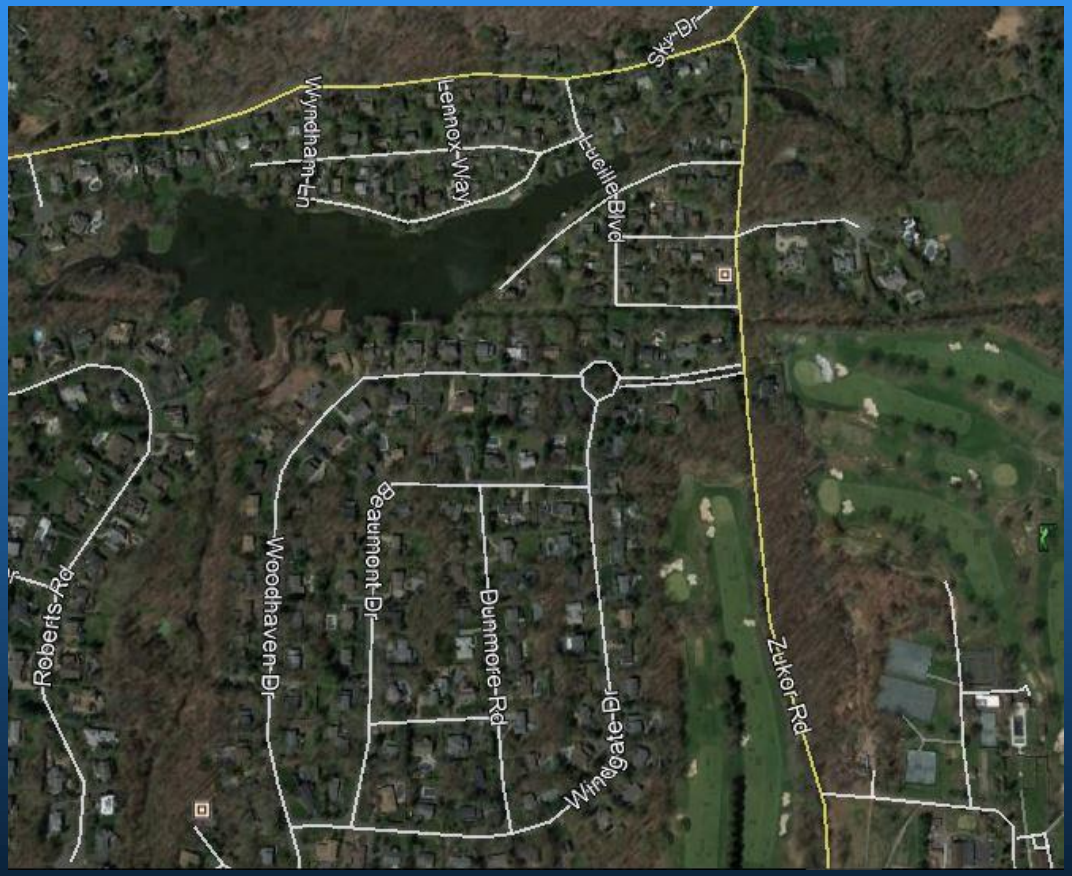
Lake Associations Have Used CSLAP Data To:

- Establish sewer districts to reduce septic system loading (Ballston, Peach)
- Support aeration projects (Peekskill, Mohegan)
- Control aquatic invasive species (lots of lakes!)
- Comply with permitting requirements (herbicides, algaecides, etc.)
- Reduce road salt

Everyone wants their lake to look like this…



Even if the Watershed Looks Like This…



CSLAP Data Should Be Used to Support Management Practices to Keep Your Lake Healthy