CSLAP 2013 Lake Water Quality Summary:
Findley Lake

General Lake Information

Location	Town of Findley Lake
County	Chautauqua
Basin	Allegheny River
Size	124.3 hectares (307.0 acres)
Lake Origins	Natural
Watershed Area	1,240 hectares (3,063 acres)
Retention Time	0.5 years
Mean Depth	3.3 meters
Sounding Depth	11.7 meters
Public Access?	cartop launch
Major Tributaries	West Branch French Creek
Lake Tributary To…	Findley Lake outlet to West Branch French Creek to Allegheny River
WQ Classification	B (contact recreation = swimming)
Lake Outlet Latitude	42.119
Lake Outlet Longitude	-79.734
Sampling Years	1986-2000, 2003-2013
2013 Samplers	Ed Mulkearn, Rick Vonk, Dennis Brumagin
Main Contact	Ed Mulkearn

Lake Map

Background

Findley Lake is a 307 acre, class B lake found in the Town of Findley Lake in Chautauqua County, in western New York State. It has first sampled as part of CSLAP in 1986.

It is one of three CSLAP lakes among the more than 15 lakes found in Chautauqua County, and one of nine CSLAP lakes among the more than 50 lakes and ponds in the Allegheny/Chemung River drainage basins.

Lake Uses

Findley Lake is a Class B lake; this means that the best intended use for the lake is for contact recreation—swimming and bathing, non-contact recreation—boating, aquatic life, and aesthetics. The lake is used by lake residents and visitors for swimming, power boating and other recreation via shoreline properties and a cartop boat launch.

It is not known by the report authors if private fish stocking occurs in Findley Lake. The state usually stocks about 1000 9 to 10 inch tiger muskellunge in the lake, and about 5500 four inch walleye were stocked several years ago. Fish species in the lake include bluegill, carp, muskellunge, northern pike, smallmouth bass, pumpkinseed sunfish, walleye, and yellow perch.

General statewide fishing regulations are applicable in Findley Lake. In addition, open season on walleye lasts from the 1st Saturday in May through March 15, with an 18 inch size limit and a take limit of three fish. Ice fishing is allowed.

Historical Water Quality Data

CSLAP sampling was conducted on Findley Lake from 1986 to 2000, and 2003 to 2013. The CSLAP reports for each of the past several years can be found on the NYSFOLA website at http://nysfola.mylaketown.com. The most recent CSLAP report and scorecard for Findley Lake can also be found on the NYSDEC web page at http://www.dec.ny.gov/lands/77881.html.

Findley Lake was sampled by the NYSDEC as part of the state ambient lake monitoring program (referred to as the LCI, or Lake Classification and Inventory Survey) in 1976 and 1985. These sampling programs indicated water quality conditions that were probably similar to those measured through CSLAP- the lake was less productive in 1985 (with nutrient and clarity readings similar to those measured in 2003 and 2004), and more productive in 1976. Conductivity readings have steadily increased from the 1970s sampling to the present day, but this has also occurred in most NYS lakes, and at present the increase in conductivity has not been connected to any other water quality changes.

Findley Lake was also sampled in 1937 as part of the Conservation Department (predecessor to the NYSDEC) Biological Survey of the Allegheny River basin. This survey showed slightly higher pH than in the typical CSLAP (or other contemporary monitoring program) sampling season, and oxygen deficits starting at a depth between 15 and 20 feet from the lake surface. The field notes for the 1937 survey included the following:

"*This, the westernmost lake in New York State, is a very irregularly shaped body of water with numerous shallow bays and several islands. The level is maintained by a dam at the north end. A large part of the south end is a shallow area with flat bottom covered with a thick growth of hornwort, waterweed, and Robbins pondweed. These plants cover almost the entire bottom and*

apparently have been the most successful invaders of what was once a wooded area, as evidenced by the numerous large submerged stumps. In this same weed bed are found many plants of the broad-leaved pondweed (P.amplifolius), of najad and bladderwort, as well as the ubiquitous waterlilies and water shield. Along the marshy shore, at the south end of the lake, are extensive marshes of cattail and large floating masses of water smartweed. Other large weed beds were found at the north end of the lake and along the east side.

Findley Lake has very poor bottom chemical conditions in the face of which it will be difficult if not impossible to improve production by stocking alone. To form the present lake, an 8-foot dam was built across the outlet of two small ponds. The total area of the two ponds was slightly more than half the area of the new lake. As a result about one-half of Findley Lake is less than 10 feet deep. Within recent years this shallow area has become quite completely choked with vegetation. During the summer this vegetation becomes so dense that only the tops are alive. In the lower levels where sufficient light fails to penetrate, the vegetation is dead or dying. While green plants normally aerate the water, here so little of the plant actually is green that stagnant conditions prevail on the bottom. It is not unusual for algal and rooted aquatic plant growths to become sufficiently unpleasant although these growths seldom become sufficiently abundant to affect fish life adversely. The conditions in Findley Lake, however, leads one to conclude that vegetation may become so abundant as to be detrimental to fishing and fish production....

Bottom samples of water taken among the vegetation at a depth of 8 feet had only 0.4 parts per million of oxygen. In contrast to this in deeper water where vegetation is lacking and where surface winds can mix the water more completely, at a depth of 14 feet there were 3.96 parts per million of oxygen at one station. At this same station below the plane of the 14-foot contour or in that areas not greatly affected by surface winds, the oxygen dropped from 0.84 parts per million at 15 feet to 0.0 parts per million on the bottom at 31 feet. From this it can be seen that among the vegetation the oxygen is less at 8 feet than at almost twice the depth where the oxygen is lacking. The bottom chemical conditions were inadequate for fish needs. A probably contributing factor is the nature of the bottom. Most of the area flooded when the dam was built was low, muck land that in earlier times had probably been covered by natural ponds.

To remedy the condition here will not be easy. Weed elimination by chemical methods is out of the question for the present since so far as is known, chemicals sufficiently strong to eliminate rooted vegetation on a large scale would kill all fish life. Algal blooms in water supply reservoirs are controlled by chemical means but here it probably could not be done without some harmful effect to fish life. Mechanical methods are the only safe means of removing rooted aquatic plants, laborious as the task may be. Wood saws or rakes may be used for the purpose but it should be pointed out that the weeds should be completely removed after they are cut for two reasons: (1) if left in the water to decompose and use up oxygen, the main purpose of their destruction would be defeated and (2) since many aquatic plants reproduce asexually, more cutting is not sufficient to stop their growth or to prevent them from spreading into other suitable areas. The process would have to be repeated as often as necessary"

There are no Findley Lake tributary sites monitored through the NYSDEC Rotating Intensive Basins (RIBS) program. The major tributary to the lake is the West Branch of French Creek, which has not been sampled through any statewide monitoring programs.

Fisheries monitoring was also conducted in at least 1988 and 1989 in support of the state stocking program. Water clarity readings were within the range found through CSLAP, but the conductivity readings in CSLAP were higher than those measured through the fisheries monitoring program.

Lake Association and Management History

Findley Lake is served by the Findley Lake Watershed Foundation. The lake association is involved in a variety of lake management activities, including:

- Water level control
- shoreline stabilization of the Nature Center's small island
- ownership and operation of the weed harvester
- depositing navigation buoys in the lake
- overseeing the lake fishery

The Findley Lake Watershed Foundation maintains a website at http://www.flwf.org/. A TMDL (Total Maximum Daily Load calculation) was developed for the lake in 2008 to identify sources of nutrients that lead to water quality problems and use impairments (http://www.dec.ny.gov/docs/water_pdf/tmdlfindley08.pdf).

Summary of 2013 CSLAP Sampling Results

Evaluation of 2013 Annual and Monthly Results Relative to 2006-2012

The summer (mid-June through mid-September) average readings are compared to historical averages for all CSLAP sampling seasons in the "Lake Condition Summary" table, and are compared to individual historical CSLAP sampling seasons in the "Long Term Data Plots – Findley Lake" section in Appendix D.

Evaluation of Eutrophication Indicators

Only one sample was collected in 2013; the assessment of lake eutrophication is significantly limited by the lack of data. The limited data indicated that water clarity was higher than normal, due to lower than normal algae levels, and consistent with a long-term increase in water clarity. Phosphorus levels were slightly lower than normal in 2013. With only one data point in 2013, seasonal changes cannot be evaluated. Lake productivity usually increases substantially during the summer.

The lake can be characterized as *eutrophic*, or highly productive, based on total phosphorus, water clarity, and chlorophyll *a* readings (all typical of *eutrophic* lakes), although the single algae and water clarity readings in 2013 were more typical of moderately productive (*mesotrophic*) lakes. The trophic state indices (TSI) evaluation suggests that chlorophyll *a* readings are higher than expected given the total phosphorus readings in the lake. This suggests that the lake may be susceptible to algal blooms with small increases in nutrient readings. Although higher than expected water clarity readings were found in 2013, it is not known if this would have continued during the rest of the summer. Overall trophic conditions are summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Potable Water Indicators

Only one sample was collected in 2013; the assessment of potable water conditions is significantly limited by the lack of data. The limited data indicated that algae levels were not

high enough to render the lake susceptible to taste and odor compounds, algal toxins, or elevated DBP (disinfection by product) compounds that could affect the potability of the water, but this is usually an issue in the lake. However, the lake is not used for drinking water. Hypolimnetic phosphorus is higher and ammonia readings are substantially higher than those measured at the lake surface. This suggests that deepwater intakes would be compromised for any "unofficial" potable water use. Deepwater phosphorus levels were much lower than normal in 2013. Potable water conditions, at least as measurable through CSLAP, are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Limnological Indicators

Only one sample was collected in 2013; the assessment of overall lake condition is significantly limited by the lack of data. The limited data indicated that conductivity readings were lower than normal in 2013. Color readings were close to normal in (the one sample in) 2013, but color has risen since the early 2000s, as in many other CSLAP lakes (perhaps due to recent wetter weather or the change in laboratories in 2002). None of the other water quality indicators has exhibited any clear long-term trends, and it is likely that the small changes in each of the limnological indicators have been within the normal range of variability in the lake. Overall limnological conditions are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Biological Condition

The 1992 phytoplankton survey showed slightly lower algal biomass than expected given the chlorophyll *a* readings in the lake, and the algal community was dominated by golden brown algae, diatoms, and blue green algae. It is not known if this community composition is typical of the lake, given the relatively low algal biomass relative to the typical chlorophyll *a* readings in the lake.

Only one sample was collected in 2013; the assessment of biological condition is significantly limited by the lack of data. The limited data indicated that the fluoroprobe screening samples analyzed by SUNY ESF found low total and blue green algae levels. In 2012, a high percentage of blue green algae when overall algae levels were highest, and shoreline blooms that were dominated by blue green algae.

Macrophyte surveys conducted through CSLAP identified at least 16 aquatic plant species, and at least two exotic plant species (*Myriophyllum spicatum,* Eurasian watermilfoil, and *Potamogeton crispus,* curly-leafed pondweed) have been found in the lake. The modified floristic quality index (FQI) data indicate that the quality of the aquatic plant community is "fair."

The composition of the fish community includes a mix of coolwater (at least four species) and warmwater (at least five species) fish species. The lake fishery can likely be described as coolwater.

Zooplankton and macroinvertebrate surveys have not been conducted through CSLAP at Findley Lake.

Biological conditions in the lake are summarized in the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Lake Perception

Only one sample was collected in 2013; the assessment of lake perception is significantly limited by the lack of data. The limited data indicated that recreational and water quality assessments were more favorable than normal in 203, despite aquatic plant coverage that was higher than normal in 2013. None of these indicators of lake perception has exhibited any clear long-term changes. Lake recreational and water quality assessments degrade during the typical summer, despite the lack of significant seasonal change in aquatic plant coverage. With only one sample, seasonal changes in lake perception could not be evaluated. Overall lake perception is summarized on the Lake Scorecard and Lake Condition Summary Table.

Evaluation of Local Climate Change

Only one sample was collected in 2013; the assessment of local climate change is significantly limited by the lack of data. The limited data indicated that water temperature readings in the summer index period were higher than normal in 2013, while air temperatures were lower than normal in 2013. Neither air nor water temperatures have exhibited any clear long-term trends. It is not known if this is an indication of the lack of local climate change or if these changes cannot be well evaluated through CSLAP.

Evaluation of Algal Toxins

Algal toxin levels can vary significantly within blooms and from shoreline to lake, and the absence of toxins in a sample does not indicate safe swimming conditions. Phycocyanin readings usually indicate a high susceptibility for harmful algal blooms (HABs). This was confirmed by the 2012 fluoroprobe screening samples, which indicated high levels of blue green algae in the open water and extremely high blue green algae concentrations in shoreline blooms. An analysis of 2012 algae bloom samples indicate microcystin readings well above the levels needed to support safe swimming, although open water microcystin readings were below this threshold. Anatoxin-a levels were elevated in some samples, indicating a threat to pets recreating in the water. Lake residents and pets should avoid direct exposure to any shoreline blooms, and pets should be washed with clean water if exposed to blooms. Only one sample was collected in 2013; the assessment of algal toxins is significantly limited by the lack of data. Neither high blue green algae levels nor high levels of toxins were apparent in (the single sample analyzed in) 2013.

Lake Condition Summary

Category	Indicator	Min	86-13 Avg	Max	2013 Avg	Classification	2013 Change?	Long-term Change?
Eutrophication Indicators	Water Clarity	0.33	1.72	5.35	3.73	Eutrophic	Higher than Normal	Increasing Slightly
	Chlorophyll *a*	0.20	30.40	274	5.00	Eutrophic	Lower than Normal	No Change
	Total Phosphorus	0.005	0.036	0.082	0.026	Eutrophic	Within Normal Range	No Change
Potable Water Indicators	Hypolimnetic Ammonia	0.00	0.52	1.91	0.66	Highly Elevated Deepwater NH4	Higher than Normal	Not known
	Hypolimnetic Arsenic							Not known
	Hypolimnetic Iron							Not known
	Hypolimnetic Manganese							Not known
Limnological Indicators	Hypolimnetic Phosphorus	0.003	0.171	0.960	0.006	Close to Surface TP Readings	Lower Than Normal	Not known
	Nitrate + Nitrite	0.00	0.03	0.38	0.04	Low NOx	Within Normal Range	No Change
	Ammonia	0.00	0.04	0.31	0.04	Low Ammonia	Within Normal Range	No Change
	Total Nitrogen	0.16	0.60	1.49	0.42	Intermediate Total Nitrogen	Within Normal Range	No Change
	pH	6.80	7.98	9.05	7.72	Alkaline	Within Normal Range	No Change
	Specific Conductance	124	208	270	179	Intermediate Hardness	Lower Than Normal	No Change
	True Color	2	16	222	14	Intermediate Color	Within Normal Range	Increasing Slightly
	Calcium	19.4	26.2	33.2		Highly Susceptible to Zebra Mussels		No Change
Lake Perception	WQ Assessment	1	2.7	5	2.0	Definite Algal Greenness	More Favorable Than Normal	No Change
	Aquatic Plant Coverage	1	2.4	4	3.0	Subsurface Plant Growth	Less Favorable than Normal	No Change
	Recreational Assessment	1	3.0	4	2.0	Slightly Impaired	More Favorable Than Normal	No Change
Biological Condition	Phytoplankton					Open water-high blue green algae biomass; Shoreline-high blue green algae in bloom	Not known	Not known
	Macrophytes					Fair quality of the aquatic plant community	Not known	Not known
	Zooplankton					Not evaluated through CSLAP	Not known	Not known
	Macroinvertebrates					Not evaluated through CSLAP	Not known	Not known
	Fish					Coolwater fishery	Not known	Not known
	Invasive Species					Eurasian watermilfoil, curly leafed pondweed	Not known	Not known
Local Climate Change	Air Temperature	9	22.8	36	21.0		Lower Than Normal?	No Change
	Water Temperature	12	22.8	30	25.0		Higher Than Normal	No Change
Harmful Algal Blooms	Open Water Phycocyanin	5	266	1291	9	Most readings indicate high risk of BGA	Not known	Not known
	Open Water FP Chl.a	1	13	38	2	Few readings indicate high algae levels	Not known	Not known
	Open Water FP BG Chl.a	0	11	37	0	Some readings indicate high BGA levels	Not known	Not known
	Open Water Microcystis	0.2	0.4	1.2	<0.30	Mostly undetectable open water MC-LR	Not known	Not known
	Open Water Anatoxin a	<DL	1.6	8.2	<DL	Open water Anatoxin-a at times detectable	Not known	Not known
	Shoreline Phycocyanin	470	3.E+05	2.E+06		All readings indicate high risk of BGA	Not known	Not known
	Screening FP Chl.a	3	12446	24295		Most readings indicate high algae levels	Not known	Not known
	Screening FP BG Chl.a	2	12445	24295		Most readings indicate high BGA levels	Not known	Not known
	Shoreline Microcystis	0.7	45.2	214.8	<0.30	Occasionally very high shoreline bloom MC-LR	Not known	Not known
	Shoreline Anatoxin a	<DL	0.2	0.0	<DL	Shoreline bloom Anatoxin-a at times detectable	Not known	Not known

Evaluation of Lake Condition Impacts to Lake Uses

Findley Lake is presently among the lakes listed on the 2007 Allegany River drainage basin Priority Waterbody List (PWL), with public bathing and recreation listed as *impaired* due to excessive nutrients, algae and weeds, and reduced water clarity. Aquatic life was listed as *stressed* due to hypolimnetic dissolved oxygen depletion. The PWL listing for Findley Lake is listed in Appendix C.

Potable Water (Drinking Water)

The CSLAP dataset at Findley Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, is inadequate to evaluate the use of the lake for potable water, and the lake is not used for this purpose. Algae (and algae toxin) levels may be high enough in the surface waters, and ammonia may be high enough in bottom waters to impact any "unofficial" use of the lake for potable water. This was not apparent in 2013, although it is likely that the same impacts did occur in 2013.

Contact Recreation (Swimming)

The CSLAP dataset at Findley Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggests that swimming and contact recreation may be *impaired* by excessive algae, poor water clarity, and shoreline harmful algal blooms, although additional information about bacterial levels is needed to evaluate the safety of the water for swimming. The limited 2013 data does not show this impairment, although more data was needed to update this assessment.

Non-Contact Recreation (Boating and Fishing)

The CSLAP dataset on Findley Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that non-contact recreation is *stressed* by excessive weeds and the presence of Eurasian watermilfoil and curly leafed pondweed. It is not known if shoreline algae blooms affect non contact recreation. The limited 2013 data does not confirm this assessment, although additional data was needed for evaluating this use.

Aquatic Life

The CSLAP dataset on Findley Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aquatic life may be *stressed* by hypolimnetic oxygen depletion, invasive plants, and *threatened* by elevated pH, although additional data are needed to evaluate the food and habitat conditions for aquatic organisms in the lake. It is not known what effect shoreline algae blooms have on aquatic life. The limited 2013 data confirmed this assessment.

Aesthetics

The CSLAP dataset on Findley Lake, including water chemistry data, physical measurements, and volunteer samplers' perception data, suggest that aesthetics may be *stressed* by excessive algae, shoreline algae blooms, and weeds, and by frequent reports that the lake "looks bad." The limited 2013 data did not confirm this assessment, although additional data would be needed to update this assessment.

Fish Consumption

There are no fish consumption advisories posted for Findley Lake.

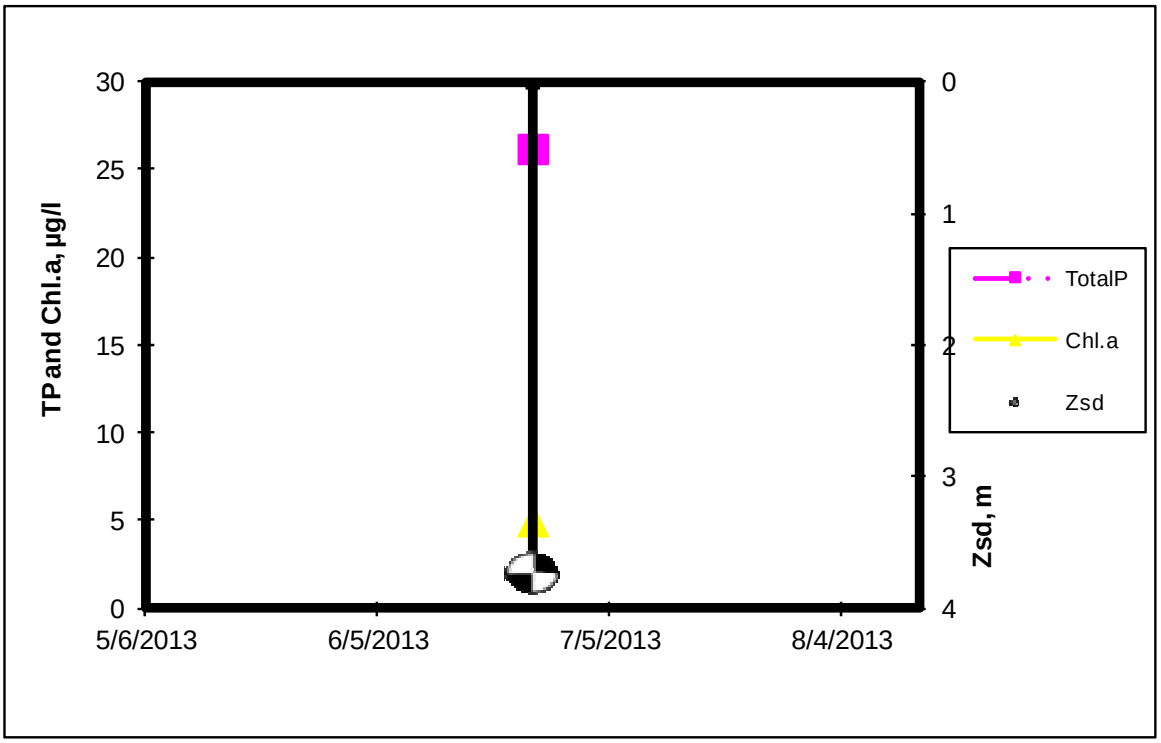
Additional Comments and Recommendations

Findley Lake should continue to be evaluated for shoreline algae blooms and the impacts from invasive species. The lake may be at risk for zebra mussels from nearby lakes. More data will be needed (in 2015) to update the assessments for the lake.

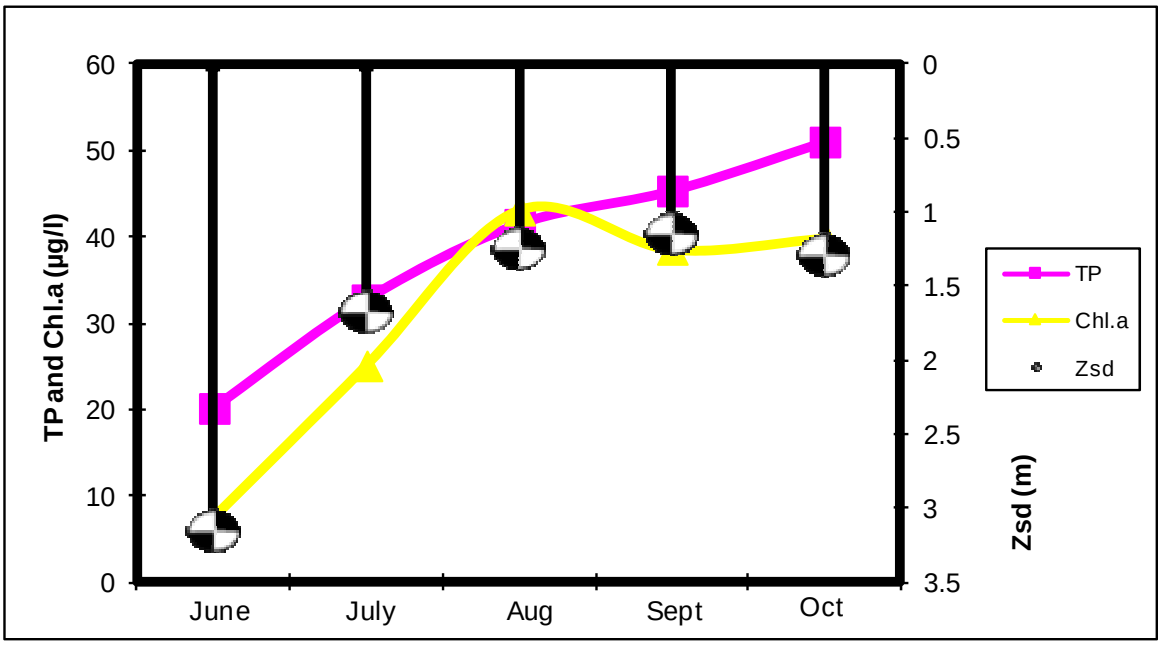
Aquatic Plant IDs-2013

None submitted for identification in 2013.

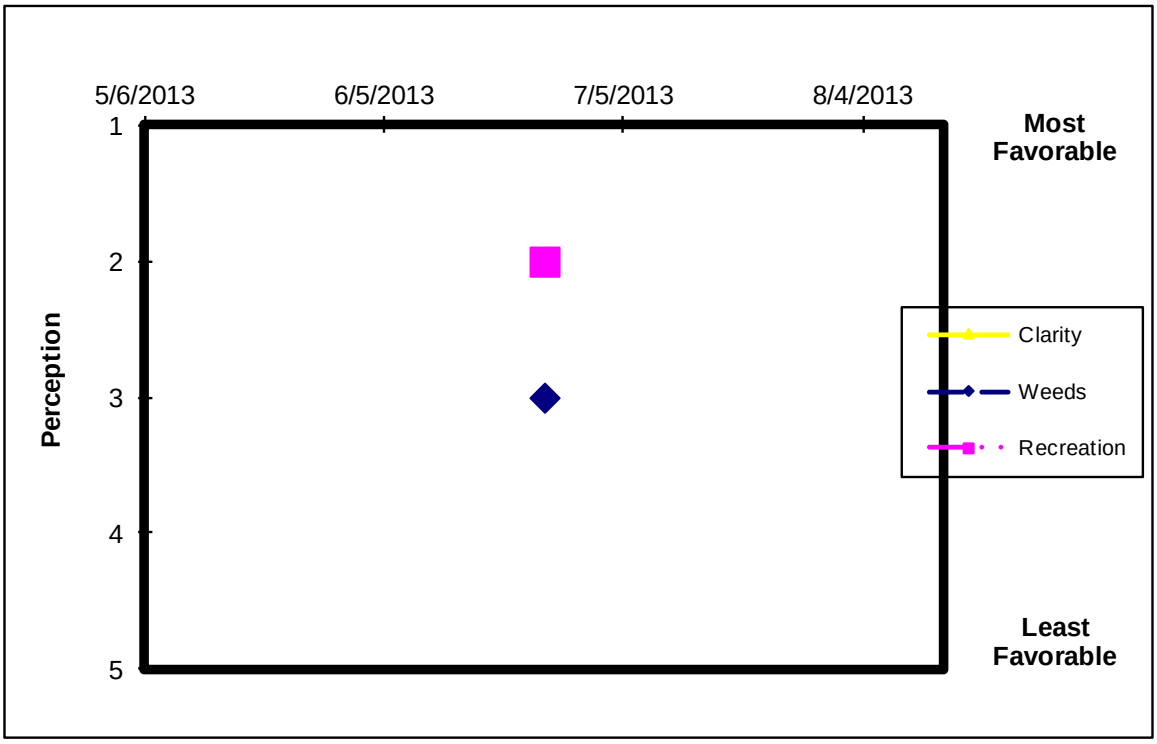
Time Series: Trophic Indicators, 2013



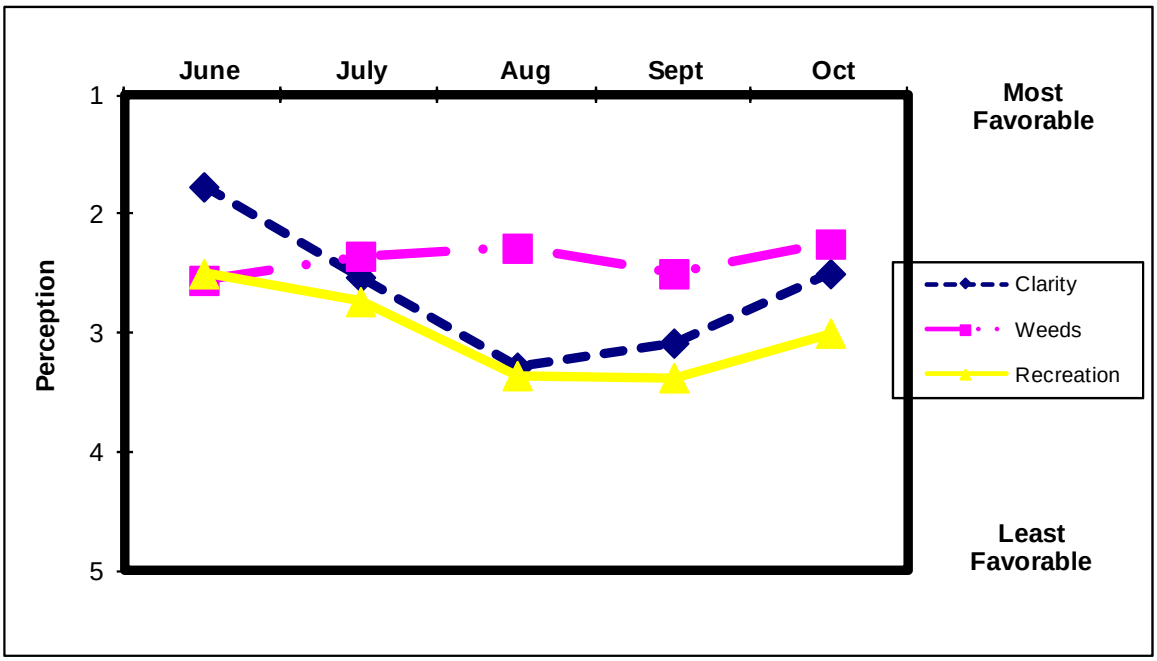
Time Series: Trophic Indicators, Typical Year (1986-2013)



Time Series: Lake Perception Indicators, 2013



Time Series: Lake Perception Indicators, Typical Year (1986-2013)



Appendix A- CSLAP Water Quality Sampling Results for Findley Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca				Chl.a
24	Findley L	6/15/1986	11.5	3.00	1.5	0.026	0.12				5	6.92	190					2.22
24	Findley L	6/21/1986	11.5	3.13	1.5	0.013	0.11				5	7.50	180					2.29
24	Findley L	6/29/1986	11.5	2.25	1.5	0.011	0.09				10	7.62	185					2.00
24	Findley L	7/3/1986	11.5	2.75	1.5	0.022	0.11				15	7.82	194					0.80
24	Findley L	7/11/1986	11.5	2.00	1.5	0.021	0.03				2	7.84	185					5.03
24	Findley L	7/18/1986	11.5	1.50	1.5	0.030	0.06				5	8.38	194					
24	Findley L	7/24/1986	11.5	2.63														
24	Findley L	8/1/1986	11.5	1.63	1.5	0.028	0.03				14	8.05	197					
24	Findley L	8/5/1986	11.5	1.13	1.5	0.018	0.03				11	7.75	191					53.30
24	Findley L	8/12/1986			1.5	0.023	0.03				13	8.15	199					15.30
24	Findley L	8/16/1986	11.5	0.75	1.5	0.035	0.03				12	8.98	195					36.30
24	Findley L	8/21/1986	11.5	0.63	1.5	0.037	0.03				15	8.12	198					40.00
24	Findley L	8/30/1986	11.5	1.00	1.5	0.034	0.03				3	7.60	205					29.60
24	Findley L	9/5/1986	11.5	0.75	1.5	0.033	0.03				3	8.17	206					25.90
24	Findley L	9/14/1986	11.5	0.63	1.5	0.036	0.03				13	7.55	215					22.20
24	Findley L	9/21/1986	11.5	0.75	1.5	0.039	0.03				8	7.29	214					34.00
24	Findley L	6/8/1987	11.5	2.75	1.5	0.023	0.03				15	8.10	201					
24	Findley L	6/14/1987	11.5	3.00	1.5	0.018					12	8.22	198					
24	Findley L	6/21/1987	11.5	2.00	1.5	0.023	0.01				15	7.83	203					17.00
24	Findley L	6/28/1987	11.8	1.25	1.5	0.021	0.01				15	7.76	202					37.70
24	Findley L	7/5/1987	11.8	0.75	1.5	0.032	0.01				11	7.70	206					
24	Findley L	7/12/1987	11.5	0.63	1.5	0.033					11	7.86	206					116.00
24	Findley L	7/19/1987	11.5	0.75	1.5	0.040	0.01				15	7.49	206					109.00
24	Findley L	7/26/1987	11.5	1.00	1.5	0.052					13	7.63	209					45.10
24	Findley L	7/30/1987	11.5	0.75	1.5	0.056					12	7.38	210					73.30
24	Findley L	8/9/1987	11.5	0.75	1.5	0.042	0.01				7	7.33	208					116.00
24	Findley L	8/16/1987	11.5	0.50	1.5	0.060					6	7.14	216					274.00
24	Findley L	8/23/1987	11.5	0.75	1.5	0.054	0.01				10	7.42	208					
24	Findley L	8/30/1987	11.5	0.75	1.5	0.052					12	7.46	204					73.00
24	Findley L	9/6/1987	11.5	0.75	1.5	0.059	0.17				8	7.36	221					99.00
24	Findley L	10/1/1987	11.5	0.75	1.5	0.049	0.03				11	7.30	215					73.20
24	Findley L	6/21/1988	12.0	2.25	1.5	0.022	0.01				8	7.72	213					17.50
24	Findley L	6/28/1988	11.5	1.75	1.5	0.022	0.01				7	7.77	219					10.10
24	Findley L	7/5/1988	11.5	1.50	1.5	0.020	0.01				9	8.10	220					10.40
24	Findley L	7/12/1988	11.0	1.00	1.5	0.023	0.01				11	8.19	234					
24	Findley L	7/19/1988	11.5	1.00	1.5	0.025	0.01				7	8.31	223					20.70
24	Findley L	7/26/1988	12.0	1.50	1.5	0.029	0.01				10	7.71	221					1.78
24	Findley L	7/31/1988	11.5	1.25	1.5	0.031	0.01				10	8.10	223					17.80
24	Findley L	8/8/1988	11.5	1.00	1.5	0.037	0.01				11	7.97	219					31.10
24	Findley L	8/12/1988	11.5	0.75	1.5	0.042	0.01				10	7.96	221					52.50
24	Findley L	8/21/1988	11.8	0.75	1.5	0.042	0.01				6	8.32	227					49.60
24	Findley L	8/30/1988	11.5	2.25	1.5	0.032	0.02				11	7.97	227					10.10
24	Findley L	9/6/1988	11.3	1.75	1.5	0.037	0.03				14	7.86	227					18.50
24	Findley L	9/12/1988	11.5	1.50	1.5	0.035	0.03				12	7.95	229					24.40
24	Findley L	9/19/1988	11.8	1.00	1.5	0.040	0.01				8	8.09	230					38.50
24	Findley L	9/25/1988	11.8	1.00	1.5	0.039	0.01				6	8.27	227					30.30
24	Findley L	6/26/1989	11.0	3.25	1.5	0.017	0.14				7	7.94	198					2.16
24	Findley L	7/2/1989	11.0	2.25	1.5	0.015					12	7.98	199					18.50
24	Findley L	7/9/1989	11.0	2.25	1.5	0.022					15	7.76	204					6.45
24	Findley L	7/16/1989	11.5	2.50	1.5	0.020					11	7.85	210					6.18
24	Findley L	7/27/1989	11.5	2.50	1.5	0.025					10	8.13	200					9.77
24	Findley L	7/31/1989	11.0	2.00	1.5	0.026					8	7.82	210					6.36
24	Findley L	8/7/1989	10.5	2.50	1.5	0.029	0.06				8	8.18	214					7.19
24	Findley L	8/14/1989	11.3	2.00	1.5	0.020					7	7.98	211					6.45
24	Findley L	8/20/1989	11.5	2.00	1.5	0.024					2	8.24	212					6.65
24	Findley L	8/29/1989	11.5	2.25	1.5	0.028					2	8.24	208					11.30
24	Findley L	9/11/1989	11.0	1.75	1.5	0.025	0.01				5	8.16	211					17.80
24	Findley L	9/25/1989	11.5	1.00	1.5	0.029					6	8.18	203					19.60
24	Findley L	10/11/1989	11.0	1.25	1.5	0.038					5	8.16	210					18.50
24	Findley L	7/10/1990	11.5	1.25	1.5	0.046	0.01					7.95						
24	Findley L	7/17/1990	11.3	1.25	1.5	0.037	0.01				13	7.72	209					36.60
24	Findley L	7/31/1990	11.5	0.75	1.5	0.048	0.01				10	7.40	199					57.40
24	Findley L	8/14/1990	11.5	0.81	1.5	0.044					10	7.24	199					45.10

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca				Chl.a
24	Findley L	8/28/1990	11.5	0.75	1.5	0.053	0.01				10	7.50	206					58.60
24	Findley L	9/11/1990	11.0	0.75	1.5	0.051	0.01				12	8.11	205					62.70
24	Findley L	9/25/1990	11.0	1.50	1.5	0.048	0.02				17	7.78	222					26.90
24	Findley L	10/10/1990	11.0	2.50	1.5	0.062						8.23	205					9.40
24	Findley L	7/22/1991	11.3	1.00	1.5	0.049	0.01				10	8.22	215					30.90
24	Findley L	8/5/1991	13.0	0.75	1.5	0.055	0.01				14	7.63	220					82.80
24	Findley L	8/19/1991	11.0	0.75	1.5	0.054	0.01				11	8.28	224					68.80
24	Findley L	9/4/1991	11.7	0.33	1.5	0.079	0.01				9	7.59	219					149.00
24	Findley L	9/18/1991	11.0	0.67	1.5	0.065						7.90	221					132.00
24	Findley L	10/1/1991	11.5	0.58	1.5	0.064					7	7.81	220					126.00
24	Findley L	6/29/1992	11.5	2.00	1.5	0.023					6	7.81	237					9.18
24	Findley L	7/18/1992	11.5	1.50	1.5	0.013					6	8.05	232					15.40
24	Findley L	8/11/1992	11.3	1.33	1.5	0.025					8	8.34	223					11.60
24	Findley L	8/31/1992	11.5	1.75	1.5	0.035					9	8.23	228					10.20
24	Findley L	9/28/1992	11.5	1.75	1.5	0.024					8	8.24	218					15.80
24	Findley L	10/10/1992	11.6	1.50	1.5	0.034					11	8.06	225					28.50
24	Findley L	7/6/1993	11.5	1.50	1.5	0.030					7	8.20	210					21.70
24	Findley L	7/20/1993	11.5	1.50	1.5	0.043					2	7.75	210					15.50
24	Findley L	8/9/1993	11.0	1.00	1.5	0.049					7	8.15	211					49.30
24	Findley L	8/30/1993	11.3	0.75	1.5	0.063					7	8.16	202					45.90
24	Findley L	9/21/1993	11.5	1.25	1.5	0.044					6	8.26	214					33.20
24	Findley L	10/4/1993	11.5	1.29	1.5	0.048					5	8.07	216					18.90
24	Findley L	6/14/1994	11.3	3.63	1.5	0.015	0.12				6	8.60	222					3.73
24	Findley L	7/5/1994	11.5	2.00	1.5	0.023					7	7.90	221					10.20
24	Findley L	7/25/1994	11.5	1.50	1.5	0.031					4	8.04	224					21.50
24	Findley L	8/15/1994	11.8	1.25	1.5	0.039	0.03				11	7.96	206					32.70
24	Findley L	9/5/1994	11.5	1.00	1.5	0.048					10	7.70	206					39.40
24	Findley L	9/26/1994	13.0	0.80	1.5	0.059					12	7.83	208					50.30
24	Findley L	6/5/1995	11.0	2.00	1.5	0.020					6							9.86
24	Findley L	6/20/1995	11.0	1.00	1.5	0.028					7	8.16	230					24.40
24	Findley L	7/10/1995	11.3	0.77	1.5	0.037						7.76	235					51.30
24	Findley L	7/17/1995	11.4	0.75	1.5	0.053	0.01				5	8.07	237					53.80
24	Findley L	7/31/1995	11.0	0.55	1.5	0.059					10	8.07	231					86.70
24	Findley L	8/14/1995	11.5	0.33	1.5	0.082					5	7.48	232					172.00
24	Findley L	6/17/1996	11.3	4.75	1.5	0.013	0.05				5	8.18	225					3.50
24	Findley L	7/12/1996	11.5	1.65	1.5	0.023	0.08				10	7.84	218					20.50
24	Findley L	7/17/1996	11.0	3.25	1.5	0.015	0.07				20	7.85	220					8.20
24	Findley L	7/29/1996	11.0	3.25	1.5	0.018	0.04				10	8.03	218					5.90
24	Findley L	8/12/1996	11.0	2.75	1.5	0.023	0.01				20	7.93	217					7.70
24	Findley L	8/26/1996	11.0	3.75	1.5	0.018	0.01				5	8.43	214					5.20
24	Findley L	9/9/1996	11.0	2.25	1.5	0.024	0.01				10	7.95	212					14.10
24	Findley L	9/23/1996	11.5	2.28	1.5	0.056	0.01				10	7.96	210					19.10
24	Findley L	6/9/1997	11.0	4.25	1.5	0.013	0.10				10	7.52	190					2.60
24	Findley L	6/23/1997	11.0	5.13	1.5	0.015	0.08				10	8.07	186					3.08
24	Findley L	7/7/1997	11.3	1.50	1.5	0.031	0.01				10	7.56	200					18.50
24	Findley L	7/21/1997	11.8	1.28	1.5	0.030	0.01				10	7.83	202					19.70
24	Findley L	8/4/1997	11.0	1.42	1.5	0.029	0.01				10	7.39	207					27.80
24	Findley L	8/18/1997	11.5	1.71	1.5	0.032	0.01				7	7.56	206					20.20
24	Findley L	9/1/1997	11.7	1.40	1.5	0.032	0.01				7	8.48	202					21.90
24	Findley L	9/15/1997	11.3	1.75	1.5	0.025	0.01				9	8.41	200					13.90
24	Findley L	6/8/1998	12.0	2.42	1.5	0.025	0.01				5	8.41	178					9.34
24	Findley L	6/22/1998	11.5	3.13	1.5	0.020	0.01				3	7.51	185					6.32
24	Findley L	7/7/1998	11.5	1.38	1.5	0.038	0.01				2	8.53	186					22.10
24	Findley L	7/20/1998	11.5	0.78	1.5	0.044	0.14				5	8.61	173					40.50
24	Findley L	8/3/1998	11.5	0.83	1.5	0.053	0.01				5	8.13	181					51.60
24	Findley L	8/17/1998	11.8	0.83	1.5	0.070					14	9.05	183					57.10
24	Findley L	8/31/1998	11.5	0.94	1.5	0.067					12	8.96	184					47.20
24	Findley L	9/14/1998	10.8	0.80	1.5	0.067					6	7.80	194					43.20
24	Findley L	6/7/1999	11.5	1.05	1.5	0.031	0.01				8	7.47	211					19.20
24	Findley L	6/21/1999	11.8	1.19	1.5	0.035	0.01				6	8.21	204					21.90
24	Findley L	7/5/1999	11.3	0.78	1.5	0.061	0.02				10	7.54	196					63.50
24	Findley L	7/19/1999	11.7	0.71	1.5	0.081	0.01				12	7.36	198					69.00
24	Findley L	8/2/1999	11.0	0.50	1.5	0.069	0.01				11	8.33	202					53.50
24	Findley L	8/16/1999	11.0	0.55	1.5	0.068	0.01				7	7.33	215					45.90
24	Findley L	8/30/1999	11.0	0.85	1.5	0.050	0.01				10	7.85	221					43.80
24	Findley L	9/12/1999	11.0	0.68	1.5	0.054	0.01				6	7.21	227					57.00

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca				Chl.a
24	Findley L	6/19/2000	11.3	2.95	1.5	0.020	0.01				8	8.18	218					4.54
24	Findley L	7/10/2000	12.0	2.00	1.5	0.017	0.01				4	7.80	217					7.10
24	Findley L	7/17/2000	11.8	1.85	1.5	0.017	0.01				6	8.36	214					7.85
24	Findley L	7/31/2000	11.0	1.95	1.5	0.023	0.01				4	8.62	210					10.80
24	Findley L	8/14/2000	11.5	1.22	1.5	0.028	0.01				6	7.38	208					22.20
24	Findley L	8/28/2000	11.5	1.13	1.5	0.042	0.01				8	8.20	210					42.10
24	Findley L	9/11/2000	11.0	1.09	1.5	0.038	0.01				9	8.04	215					28.20
24	Findley L	9/25/2000	11.8	2.25	1.5	0.023	0.04				8	8.09	222					6.95
24	Findley L	06/15/03	8.3	5.35		0.011	0.09	0.03	0.36	72.66	7	7.95	245	31.0				2.46
24	Findley L	06/29/03	11.5	4.15		0.005	0.04	0.02	0.30	126.92	6	8.33	251					7.79
24	Findley L	07/13/03	11.1	1.95		0.017	0.02	0.00	0.23	29.22	10	8.52	242					1.09
24	Findley L	07/28/03	10.9	2.00		0.021	0.01	0.02	0.16	17.06	9	8.33	233					3.33
24	Findley L	08/10/03	8.7	3.05		0.018	0.03	0.04	0.59	72.43	20	8.32	229	29.0				3.35
24	Findley L	08/24/03	9.0	2.00		0.027	0.00	0.01	0.41	34.02	45	8.50	223					5.90
24	Findley L	09/07/03	10.1	1.90		0.025	0.03	0.03			43	8.42	218					32.94
24	Findley L	09/21/03	11.1	1.15		0.032	0.02	0.04	0.37	25.80	46	8.26	227					4.99
24	Findley L	6/13/2004	13.0	3.00		0.017	0.05	0.01	0.27	35.32	20	7.01	241	23.8				0.61
24	Findley L	6/27/2004	10.3	3.20		0.017	0.01	0.01	0.32	40.64	20	7.34	233					2.70
24	Findley L	7/18/2004	11.0	1.70		0.029	0.25	0.02	1.36	103.10	10	8.20	211					29.20
24	Findley L	8/15/2004		1.20	0.6	0.000	0.01	0.02	0.46		13	7.14	214					10.60
24	Findley L	9/18/2005	5.2	0.98	0.6	0.050	0.01	0.02	0.24	10.69	13	7.47	188					20.9
24	Findley L	10/2/2005	11.0	0.95	0.6	0.054	0.03	0.03	0.26	10.50	17	7.81	209					30.0
24	Findley L	6/18/2006	10.0	4.00		0.014	0.05	0.02	0.38	59.33	21	7.99	215	22.1				2.07
24	Findley L	7/17/2006	10.6	3.60		0.017	0.02	0.02	0.46	59.59	7	8.46	267					2.05
24	Findley L	6/30/2007	11.5	2.85		0.030	0.01	0.03	0.39	29.06	25	8.85	177	19.4				6.51
24	Findley L	7/15/2007	10.9	1.80		0.076	0.01	0.05	0.57	16.72	30	8.97						13.20
24	Findley L	7/29/2007	11.3	1.25		0.059	0.06	0.04	0.87	32.83	28	8.98	203					42.30
24	Findley L	8/11/2007	11.2	0.90		0.058	0.03	0.11	0.97	37.03		8.47	226					47.20
24	Findley L	8/25/2007	11.5	0.60		0.056	0.00	0.02	0.99	39.40	96	8.67	183	22.5				3.72
24	Findley L	9/8/2007	11.8	0.78		0.055	0.01	0.03	1.45	58.03	19	8.38	184					50.56
24	Findley L	9/16/2007	11.3	0.88		0.049	0.01	0.16	0.84	37.62	15	7.94	214					35.40
24	Findley L	9/30/2007	11.5	0.90		0.054	0.01	0.02	0.94	38.78	11	7.98	220					46.84
24	Findley L	6/8/2008	11.3	4.10	1.5	0.020	0.05	0.04	0.39	44.20	7	8.11	225	27.7				2.72
24	Findley L	6/16/2008	11.0	4.40	1.0	0.025	0.02	0.02	0.19	17.25	120	7.92	172					0.38
24	Findley L	6/30/2008	11.1	3.00	1.0	0.016	0.09	0.04	0.25	33.72	41	8.42	201					2.16
24	Findley L	7/14/2008	11.0	2.05	1.0	0.021	0.01	0.02	0.28	29.04	16	8.18	193					5.24
24	Findley L	8/4/2008	11.7	1.30	1.0	0.031	0.00	0.05	0.47	32.84	22	8.47	213	23.8				23.62
24	Findley L	8/11/2008	11.0	1.10	1.0	0.035	0.01	0.05	0.46	28.73	29	8.16	216					26.42
24	Findley L	9/2/2008	11.1	0.65	1.0	0.054	0.00	0.06	1.04	42.78	49	8.47	166					66.24
24	Findley L	9/23/2008	11.6	0.75	1.0	0.049	0.02	0.06	0.78	34.53	31	8.09	220					52.76
24	Findley L	06/19/2009	11.6	4.30	1.5	0.016	0.00	0.02	0.30	41.00	22	8.07	196	28.4				5.42
24	Findley L	07/03/2009	12.0	2.95		0.017	0.04	0.03	0.27	35.25	33	8.09	158					1.45
24	Findley L	07/18/2009	10.8	2.70	1.0	0.024	0.01	0.04	0.31	28.55	34	7.60	161					1.43
24	Findley L	07/31/2009	11.4	2.45	1.0	0.019	0.01	0.04	0.28	33.00	25	7.88	154					10.51
24	Findley L	08/13/2009	11.7	2.35	1.5	0.019	0.03	0.02	0.32	36.93	39	7.92	166	30.3				5.70
24	Findley L	08/30/2009	10.6	1.45	1.5	0.029	0.01	0.06	0.32	24.42	28	7.69	208					18.00
24	Findley L	09/07/2009	11.7	1.15	1.5	0.030	0.38	0.05	0.48	35.19	37	7.93	166					23.80
24	Findley L	09/07/2009	grab	HAB														
24	Findley L	09/18/2009	11.0	1.65	1.5	0.028	0.01	0.04	0.49	38.60	53	6.82	181					3.00
24	Findley L	6/4/2010	11.6	4.95	1.0	0.018	0.01	0.03	0.34	41.69	28	8.19	222	29.9				0.20
24	Findley L	6/17/2010	11.1	3.65	1.0	0.017	0.01	0.04	0.51	65.36	16	8.43	270					4.80
24	Findley L	7/1/2010	10.8	2.65	1.0	0.020	0.01	0.02	0.35	38.50	16	8.38	218					5.20
24	Findley L	7/25/2010	11.4	0.90	1.0	0.043	0.01	0.03	0.60	30.48	104	8.46	202					10.60
24	Findley L	8/1/2010	11.5	0.85	1.0	0.044	0.01	0.03	0.88	43.50	49	8.97	211	33.2				35.30
24	Findley L	8/1/2010	grab	HAB														
24	Findley L	8/4/2010	grab	HAB														
24	Findley L	8/4/2010	grab	HAB														
24	Findley L	8/8/2010	11.7	0.80	1.0	0.051	0.01	0.03			20	8.30	221					30.40
24	Findley L	8/25/2010	grab	HAB														
24	Findley L	8/25/2010	grab	HAB														
24	Findley L	8/25/2010	grab	HAB														
24	Findley L	8/29/2010	11.6	0.63	1.0	0.069	0.02	0.04	1.16	36.97	222	8.29	251					67.40
24	Findley L	9/23/2010	11.7	0.70	1.0	0.073	0.05	0.05	1.13	34.32	55	7.57	242					54.60
24	Findley L	9/25/2010	grab	HAB														
24	Findley L	7/17/2011	11.4	3.85		0.016	0.01	0.01	0.30	39.98	17	8.43	204	29.9				
24	Findley L	7/31/2011		2.98		0.022	0.01	0.02	0.36	35.90	28	7.69	124					18.20

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca				Chl.a
24	Findley L	9/25/2011				0.064	0.01	0.05	1.49	51.17	64	7.92	189					18.20
24	Findley L	6/17/2012		4.43		0.022	0.01	0.04	0.49	49.81	28	8.52	161	21.3				6.40
24	Findley L	6/20/2012	9.9	3.50	1.5	0.038	0.01	0.03	0.28	16.11	8	6.80	194					4.30
24	Findley L	7/17/2012	10.5	0.80	1.5	0.041	0.01	0.03	0.98	52.76	46	8.83	155					36.20
24	Findley L	7/22/2012	9.7	0.90	1.5	0.045	0.02	0.03	1.08	52.26	19	8.62	170					33.40
24	Findley L	8/6/2012	9.5	0.60	1.5	0.065	0.02	0.01	1.24	42.20	12	8.44	140	20.8				74.90
24	Findley L	8/22/2012	9.2	0.53	1.5	0.066	0.05	0.23	1.43	47.38	15	7.51	209					76.90
24	Findley L	9/11/2012	9.5	0.68	1.5	0.068	0.01	0.04	0.63	20.54	7	7.30	185					51.10
24	Findley L	10/12/2012	9.5	1.50	1.5	0.060	0.03	0.31	1.04	38.24	10	6.87	175					14.50
24	Findley L	6/25/2013	11.4	3.73	1.5	0.026	0.04	0.04	0.42	34.85	14	7.72	179					5.00
LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP								NO2
24	Findley L	6/22/1998			10.0	0.211												
24	Findley L	7/20/1998				0.465												
24	Findley L	8/17/1998				0.618												
24	Findley L	9/14/1998				0.960												
24	Findley L	06/15/03				0.012	0.11	0.08	0.28	23.33								
24	Findley L	06/29/03				0.008	0.02	0.02	0.31	37.80								
24	Findley L	07/13/03				0.017	0.04	0.06	0.36	21.19								
24	Findley L	07/28/03				0.018	0.00	0.00	0.05	2.50								
24	Findley L	08/10/03				0.003	0.06	0.03	0.63	186.11								
24	Findley L	08/24/03				0.017	0.00	0.01	0.43	25.40								
24	Findley L	09/07/03				0.025	0.03	0.01										
24	Findley L	09/21/03				0.028	0.01	0.01	0.37	13.42								
24	Findley L	6/13/2004				0.036	0.07	0.02	0.50	13.87								
24	Findley L	6/30/2007	11.5			0.140												
24	Findley L	7/15/2007	10.9			0.070												
24	Findley L	7/29/2007	11.3			0.154												
24	Findley L	8/11/2007	11.2			0.199												
24	Findley L	8/25/2007	11.5			0.192												
24	Findley L	9/8/2007	11.8			0.045												
24	Findley L	9/16/2007	11.3			0.242												
24	Findley L	9/30/2007	11.5			0.565												
24	Findley L	6/8/2008	11.3		10.0	0.029												
24	Findley L	6/16/2008	11.0		10.0	0.072												
24	Findley L	6/30/2008	11.1		10.0	0.019												
24	Findley L	7/14/2008	11.0		10.0	0.038												
24	Findley L	8/4/2008	11.7		10.0	0.106												
24	Findley L	8/11/2008	11.0		9.0	0.092												
24	Findley L	9/2/2008	11.1		10.1	0.477												
24	Findley L	9/23/2008	11.6		10.0	0.416												
24	Findley L	06/19/2009			10.0	0.038		0.40										
24	Findley L	07/03/2009				0.145		0.66										
24	Findley L	07/18/2009			9.5	0.009		0.51										
24	Findley L	07/31/2009			10.0	0.180		0.72										
24	Findley L	08/13/2009			10.0	0.220		0.03										
24	Findley L	08/30/2009			9.5	0.276		1.41										
24	Findley L	09/07/2009			10.0	0.150		1.44										
24	Findley L	09/18/2009			10.0	0.366		1.09										
24	Findley L	6/4/2010	11.6		10.0	0.033		0.33										
24	Findley L	6/17/2010	11.1		10.0	0.037		0.34										
24	Findley L	7/1/2010	10.8		9.0	0.033		0.14										
24	Findley L	7/25/2010	11.4		10.0	0.247		0.78										
24	Findley L	8/1/2010	11.5		10.0	0.194		0.67										
24	Findley L	8/8/2010	11.7		10.0	0.244		0.57										
24	Findley L	8/29/2010	11.6		10.0	0.272		0.95										
24	Findley L	9/23/2010	11.7		10.0	0.190		1.39										
24	Findley L	7/17/2011	11.4		11.0	0.321		1.22										0.01
24	Findley L	7/31/2011			11.3	0.095		1.04										0.01
24	Findley L	9/25/2011				0.484		1.91										0.01
24	Findley L	6/17/2012				0.068		0.37										
24	Findley L	6/26/2012			9.0	0.020		0.03										0.00
24	Findley L	7/17/2012				0.020		0.14										0.00
24	Findley L	7/22/2012			8.5	0.087		0.25										0.00
24	Findley L	8/6/2012			8.5	0.141		0.42										0.00
24	Findley L	8/23/2012			8.5	0.309		1.01										0.00

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP								NO2
24	Findley L	9/11/2012			9.0	0.256		0.09										0.00
24	Findley L	10/12/2012			8.5	0.055		0.35										0.01
24	Findley L	6/25/2013			9.5	0.006		0.66										

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cyl	FP-Chl	FP-BG	HAB form	Shore HAB
24	Findley L	6/15/1986	epi	18	19															
24	Findley L	6/21/1986	epi	23	20															
24	Findley L	6/29/1986	epi	22	21															
24	Findley L	7/3/1986	epi	15	20															
24	Findley L	7/11/1986	epi	15	20															
24	Findley L	7/18/1986	epi	30	24															
24	Findley L	7/24/1986	epi	30	25															
24	Findley L	8/1/1986	epi	26	24															
24	Findley L	8/5/1986	epi	26	25															
24	Findley L	8/16/1986	epi	24	24															
24	Findley L	8/21/1986	epi	26	25															
24	Findley L	8/30/1986	epi	20	19															
24	Findley L	9/5/1986	epi	21	20															
24	Findley L	9/14/1986	epi	14	19															
24	Findley L	9/21/1986	epi	17	18															
24	Findley L	6/8/1987	epi	22	24															
24	Findley L	6/14/1987	epi	25	22															
24	Findley L	6/21/1987	epi	27	25															
24	Findley L	6/28/1987	epi	19	23															
24	Findley L	7/5/1987	epi	23	23															
24	Findley L	7/12/1987	epi	30	27															
24	Findley L	7/19/1987	epi	27	26															
24	Findley L	7/26/1987	epi	24	27															
24	Findley L	7/30/1987	epi	25	27															
24	Findley L	8/9/1987	epi	24	24															
24	Findley L	8/16/1987	epi	27	27															
24	Findley L	8/23/1987	epi	18	22															
24	Findley L	8/30/1987	epi	21	20															
24	Findley L	9/6/1987	epi	19	19															
24	Findley L	10/1/1987	epi	14	17															
24	Findley L	6/21/1988	epi	25	24															
24	Findley L	6/28/1988	epi	20	24															
24	Findley L	7/5/1988	epi	29	25															
24	Findley L	7/12/1988	epi	28	27															
24	Findley L	7/19/1988	epi	26	28															
24	Findley L	7/26/1988	epi	26	25															
24	Findley L	7/31/1988	epi	24	26															
24	Findley L	8/8/1988	epi	27	28															
24	Findley L	8/12/1988	epi	26	27															
24	Findley L	8/21/1988	epi	20	25															
24	Findley L	8/30/1988	epi	18	23															
24	Findley L	9/6/1988	epi	15	20															
24	Findley L	9/12/1988	epi	24	20															
24	Findley L	9/19/1988	epi	24	20															
24	Findley L	9/25/1988	epi	24	18															
24	Findley L	6/26/1989	epi	29	27															
24	Findley L	7/2/1989	epi	22	23															
24	Findley L	7/9/1989	epi	27	25															
24	Findley L	7/16/1989	epi	25	24															
24	Findley L	7/27/1989	epi	27	25															
24	Findley L	7/31/1989	epi	21	24															
24	Findley L	8/7/1989	epi	17	23															
24	Findley L	8/14/1989	epi	24	22															
24	Findley L	8/20/1989	epi	20	23															
24	Findley L	8/29/1989	epi	26	24															
24	Findley L	9/11/1989	epi	21	22															
24	Findley L	9/25/1989	epi	14	16															
24	Findley L	10/11/1989	epi	11	12															
24	Findley L	7/10/1990	epi	22	23															
24	Findley L	7/17/1990	epi	25	23															

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cyl	FP-Chl	FP-BG	HAB form	Shore HAB
24	Findley L	7/31/1990	epi	21	24															
24	Findley L	8/14/1990	epi	22	23															
24	Findley L	8/28/1990	epi	23	23															
24	Findley L	9/11/1990	epi	21	22															
24	Findley L	9/25/1990	epi	14	15															
24	Findley L	10/10/1990	epi	21	16															
24	Findley L	7/22/1991	epi	26	27															
24	Findley L	8/5/1991	epi	24	23															
24	Findley L	8/19/1991	epi	23	24															
24	Findley L	9/4/1991	epi	20	22															
24	Findley L	9/18/1991	epi	20	22															
24	Findley L	10/1/1991	epi	19	17															
24	Findley L	6/29/1992	epi	22	21	3	2	3	1											
24	Findley L	7/18/1992	epi	22	23	3	2	3	14											
24	Findley L	8/11/1992	epi	23	24															
24	Findley L	8/31/1992	epi	17	20	3	2	2	15											
24	Findley L	9/28/1992	epi	20	18	2	2	2	5											
24	Findley L	10/10/1992	epi	14	15	2	3	3	5											
24	Findley L	7/6/1993	epi	26	25	3	2	2												
24	Findley L	7/20/1993	epi	21	24	3	2	3	5											
24	Findley L	8/9/1993	epi	24	23	3	2	3	1											
24	Findley L	8/30/1993	epi	27	26	3	3	4	123											
24	Findley L	9/21/1993	epi	15	18	2	4	4	25											
24	Findley L	10/4/1993	epi	17	14	3	3	4	125											
24	Findley L	6/14/1994	epi	31	23	2	2	2												
24	Findley L	7/5/1994	epi	27	24	2	2	3	56											
24	Findley L	7/25/1994	epi	23	25	3	2	3	14											
24	Findley L	8/15/1994	epi	21	21	3	2	4	135											
24	Findley L	9/5/1994	epi	19	20	4	2	3	134											
24	Findley L	9/26/1994	epi	19	19	3	3	4	135											
24	Findley L	6/5/1995	epi	25	22	2	2	2												
24	Findley L	6/20/1995	epi	30	27	3	2	4	14											
24	Findley L	7/10/1995	epi	23	23	3	3	3	15											
24	Findley L	7/17/1995	epi	28	27	3	2	3	14											
24	Findley L	7/31/1995	epi	30	28	3	3	3	134											
24	Findley L	8/14/1995	epi	31	27	4	2	3	134											
24	Findley L	6/17/1996	epi	24	22	1	2	1												
24	Findley L	7/12/1996	epi	27	25	2	2	3	14											
24	Findley L	7/17/1996	epi	32	25	2	2	3												
24	Findley L	7/29/1996	epi	22	23	2	2	2	5											
24	Findley L	8/12/1996	epi	22	23	2	2	3	2											
24	Findley L	8/26/1996	epi	23	24															
24	Findley L	9/9/1996	epi	25	22	3	4	4	24											
24	Findley L	9/23/1996	epi	19	17	3	4	4	24											
24	Findley L	6/9/1997	epi	24	19	1	3	3	2											
24	Findley L	6/23/1997	epi	24	23	1	3	3	2											
24	Findley L	7/7/1997	epi	20	23	3	2	3	1											
24	Findley L	7/21/1997	epi	26	25	3	3	3	134											
24	Findley L	8/4/1997	epi	20	23	3	3	3	2334											
24	Findley L	8/18/1997	epi	19	22	3	3	4	124											
24	Findley L	9/1/1997	epi	26	22	3	3	4	124											
24	Findley L	9/15/1997	epi	24	21	3	3	4	12											
24	Findley L	6/8/1998	epi	17	18	2	4	4	2											
24	Findley L	6/22/1998	epi	25	24	2	4	4	24											
24	Findley L	7/7/1998	epi	26	25	3	4	4	124											
24	Findley L	7/20/1998	epi	29	26	3	4	4	1234											
24	Findley L	8/3/1998	epi	25	23	5	4	4	1234											
24	Findley L	8/17/1998	epi	30	25	4	3	4	124											
24	Findley L	8/31/1998	epi	24	23	4	4	4	1234											
24	Findley L	9/14/1998	epi	22	20	4	3	4	1234											
24	Findley L	6/7/1999	epi	35	25	3	3	3	234											
24	Findley L	6/21/1999	epi	20	22	3	3	3	24											
24	Findley L	7/5/1999	epi	33	24	3	3	4	124											
24	Findley L	7/19/1999	epi	27	26	3	3	3	1234											
24	Findley L	8/2/1999	epi	23	26	4	3	4	134											

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cyl	FP-Chl	FP-BG	HAB form	Shore HAB
24	Findley L	8/16/1999	epi	28	22	3	3	4	134											
24	Findley L	8/30/1999	epi	20	22	4	2	4	134											
24	Findley L	9/12/1999	epi	22	21	4	3	3	134											
24	Findley L	6/19/2000	epi	26	22	2	3	2	2											
24	Findley L	7/10/2000	epi	26		2	3	3	2											
24	Findley L	7/17/2000	epi	27	24	2	3	3	2											
24	Findley L	7/31/2000	epi	29	26	2	3	3	12											
24	Findley L	8/14/2000	epi	27	25	3	2	3	125											
24	Findley L	8/28/2000	epi	27	23	3	2	4	13											
24	Findley L	9/11/2000	epi	26	24	3	2	3	134											
24	Findley L	9/25/2000	epi	12	18	2	2	2	5											
24	Findley L	06/15/03	epi	27		2	2	2												
24	Findley L	06/29/03	epi	25	23	2	3	3	2											
24	Findley L	07/13/03	epi	36	24															
24	Findley L	07/28/03	epi	22	23															
24	Findley L	08/10/03	epi	26	25															
24	Findley L	08/24/03	epi	20	25															
24	Findley L	09/07/03	epi	20	22	3	3	4	25											
24	Findley L	09/21/03	epi	21	22	4	4	4	123											
24	Findley L	6/13/2004	epi	25	22	2	3	3	2											
24	Findley L	6/27/2004	epi	22	22	2	3	3	2											
24	Findley L	7/18/2004	epi	27	23	3	2	3	13											
24	Findley L	8/15/2004	epi	24	21	3	2	3	3											
24	Findley L	9/18/2005	epi	24	23	3	1	3	3											
24	Findley L	10/2/2005	epi	29	18	3	1	3	13											
24	Findley L	6/18/2006	epi	29	25		3		2											
24	Findley L	7/17/2006	epi	29		2	1	2	8											
24	Findley L	6/30/2007	epi	13	22	2	3	3	2											
24	Findley L	7/15/2007	epi	17	23	3	2	3	15											
24	Findley L	7/29/2007	epi	18	24	3	2	3	123											
24	Findley L	8/11/2007	epi	17	26	3	1	3	1238											
24	Findley L	8/25/2007	epi	22	27	4	1	4	1234											
24	Findley L	9/8/2007	epi	19	26	4	2	3	158											
24	Findley L	9/16/2007	epi	11	20	4	2	3	12358											
24	Findley L	9/30/2007	epi	9	18	3	1	3	1											
24	Findley L	6/8/2008	epi	23	20	1	1	1	8											
24	Findley L	6/16/2008	epi	22	21	1	2	2	5											
24	Findley L	6/30/2008	epi	17	21	2	2	2	58											
24	Findley L	7/14/2008	epi	25	24	2	2	2	8											
24	Findley L	8/4/2008	epi	20	25	3	2	2	18											
24	Findley L	8/11/2008	epi	20	22	3	1	2	157											
24	Findley L	9/2/2008	epi	26	25	4	3	4	1378											
24	Findley L	9/23/2008	epi	19	18	3	2	3	18											
24	Findley L	06/19/2009	epi	25	23	1	2	2	0											
24	Findley L	07/03/2009	epi	21	21	2	2	2	0											
24	Findley L	07/18/2009	epi	20	22	2	1	2	8											
24	Findley L	07/31/2009	epi	23	24	2	2	3	56											
24	Findley L	08/13/2009	epi	26	24	2	2	3	68					0.45						
24	Findley L	08/30/2009	epi	19	21	3	2	3	5											
24	Findley L	09/07/2009	epi	22	22	2	2	3	1					0.99						
24	Findley L	09/07/2009	bloom											126.7						
24	Findley L	09/18/2009	epi	21	21	2	3	2	3	8		150.6								
24	Findley L	6/4/2010	epi	25	20	2	1	2	1	0	5									
24	Findley L	6/17/2010	epi	20	18	2	1	2	2	0	0									
24	Findley L	7/1/2010	epi	20	23	2	1	2	2	8	0									
24	Findley L	7/25/2010	epi	24	27	2	3	1	2	15	0									
24	Findley L	8/1/2010	epi	30	27	2	3	2	3	13	0	1291.		1.16						
24	Findley L	8/1/2010	bloom									480.0		0.73						
24	Findley L	8/4/2010	bloom									1076.		1.05						
24	Findley L	8/4/2010	bloom									7496.		9.84						
24	Findley L	8/8/2010	epi	22	24	2	3	2	3	18	0									
24	Findley L	8/25/2010	bloom									3940.		2.42						
24	Findley L	8/25/2010	bloom									470.0		9.19						
24	Findley L	8/25/2010	bloom									7870.		4.82						
24	Findley L	8/29/2010	epi	20	24	2	4	2	4	1	4									

LNum	PName	Date	Site	TAir	TH20	QA	QB	QC	QD	QF	QG	AQ-PC	AQ-Chla	MC-LR	Ana-a	Cyl	FP-Chl	FP-BG	HAB form	Shore HAB
24	Findley L	9/23/2010	epi	17	20	2	3	2	3	1	4	465.0		0.20						
24	Findley L	9/25/2010	bloom									2e06		11.10						
24	Findley L	7/17/2011	epi		27	2	2	3	1	0	0	11.70	1.80							
24	Findley L	7/31/2011	epi	29	27	2	2	3	1	0	0	52.30	5.10							
24	Findley L	9/25/2011	bloom									784.4	13.50							
24	Findley L	2011	bloom											0.22						
24	Findley L	2011	bloom											214.8						
24	Findley L	6/17/2012	epi	25	24	1	3	3	2	0	0	4.80	0.40	<0.30	<0.417		1.16	0.80	I	
24	Findley L	6/20/2012	epi	24	26	1	2	2	8	0	0	12.80	0.40	<0.30	<0.428		3.43	2.86	I	
24	Findley L	7/17/2012	epi	31	30	3	3	3	13	4	4	126.3	1.80	0.38	<0.392		22.20	18.90	B	
24	Findley L	7/22/2012	epi	19	26	3	2	3	1234	4	4	183.9	1.60	0.33	<0.292		15.06	13.65	BC	
24	Findley L	8/6/2012	epi	23	27	3	2	3	123	47	4	284.8	2.00	<0.30	3.55		38.25	37.03	F	
24	Findley L	8/13/2012	bloom											118.9	<1.074		13039	13039	ABCD	
24	Findley L	8/22/2012	epi	22	25	4	3	4	1234	4	4	137.2	1.90	0.57	8.23		16.69	5.42	B	
24	Findley L	8/23/2012	bloom											19.46	0.03		3.42	1.67		
24	Findley L	8/23/2012	bloom											19.45	0.04		24295	24295		
24	Findley L	9/11/2012	epi	20	24	2	1	4	134	4	4	602.6	1.80	<0.30	<3.299		8.35	8.35	B	
24	Findley L	10/12/2012	epi	10	15	2	2	2	0	0	4	73.70	0.70	0.48	<3.205		9.96	9.65	I	
24	Findley L	6/25/2013	epi	21	25	2	3	2	2	0	0	9.10	1.30	<0.30	<0.400		2.40	0.40	I	I
24	Findley L	6/22/1998	hypo		14															
24	Findley L	7/20/1998	hypo		15															
24	Findley L	9/14/1998	hypo		12															
24	Findley L	6/4/2010	hypo		24															
24	Findley L	6/17/2010	hypo		22															
24	Findley L	7/1/2010	hypo		19															
24	Findley L	7/25/2010	hypo		20															
24	Findley L	8/1/2010	hypo		20															
24	Findley L	8/8/2010	hypo		20															
24	Findley L	8/29/2010	hypo		20															
24	Findley L	9/23/2010	hypo		17															
24	Findley L	6/26/2012	hypo		17															
24	Findley L	7/22/2012	hypo		14															
24	Findley L	8/6/2012	hypo		15															
24	Findley L	8/23/2012	hypo		14															
24	Findley L	9/11/2012	hypo		15															
24	Findley L	10/12/2012	hypo		14															
24	Findley L	6/25/2013	hypo		14															

Legend Information

Indicator	*Description*	*Detection Limit*	*Standard (S) / Criteria (C)*
General Information			
Lnum	lake number (unique to CSLAP)		
Lname	name of lake (as it appears in the Gazetteer of NYS Lakes)		
Date	sampling date		
Field Parameters			
Zbot	lake depth at sampling point, meters (m)		
Zsd	Secchi disk transparency or clarity	0.1m	1.2m (C)
Zsamp	water sample depth (m) (epi = surface, hypo = bottom)	0.1m	none
Tair	air temperature (C)	-10C	none
TH20	water temperature (C)	-10C	none
Laboratory Parameters			
Tot.P	total phosphorus (mg/l)	0.003 mg/l	0.020 mg/l (C)
NOx	nitrate + nitrite (mg/l)	0.01 mg/l	10 mg/l NO3 (S), 2 mg/l NO2 (S)
NH4	total ammonia (mg/l)	0.01 mg/l	2 mg/l NH4 (S)
TN	total nitrogen (mg/l)	0.01 mg/l	none
TN/TP	nitrogen to phosphorus (molar) ratio, = (TKN + NOx)*2.2/TP		none
TCOLOR	true (filtered) color (ptu, platinum color units)	1 ptu	none
pH	powers of hydrogen (S.U., standard pH units)	0.1 S.U.	6.5, 8.5 S.U. (S)
Cond25	specific conductance, corrected to 25C (umho/cm)	1 umho/cm	none
Ca	calcium (mg/l)	1 mg/l	none
Chl.a	chlorophyll a (ug/l)	0.01 ug/l	none
Fe	iron (mg/l)	0.1 mg/1	1.0 mg/l (S)
Mn	manganese (mg/l)	0.01 mg/l	0.3 mg/l (S)
As	arsenic (ug/l)	1 ug/l	10 ug/l (S)
AQ-PC	Phycocyanin (aquaflor) (unitless)	1 unit	none
AQ-Chl	Chlorophyll *a* (aquaflor) (ug/l)	1 ug/l	none
MC-LR	Microcystis-LR (ug/l)	0.01 ug/l	1 ug/l potable (C) 20 ug/l swimming (C)
Ana	Anatoxin-a (ug/l)	0.3 ug/l	none
Cyl	Cylindrospermposin (ug/l)	0.1 ug/l	none
Lake Assessment			
QA	water quality assessment; 1 = crystal clear, 2 = not quite crystal clear, 3 = definite algae greenness, 4 = high algae levels, 5 = severely high algae levels		
QB	aquatic plant assessment; 1 = no plants visible, 2 = plants below surface, 3 = plants at surface, 4 = plants dense at surface, 5 = surface plant coverage		
QC	recreational assessment; 1 = could not be nicer, 2 = excellent, 3 = slightly impaired, 4 = substantially impaired, 5 = lake not usable		
QD	reasons for recreational assessment; 1 = poor water clarity, 2 = excessive weeds, 3 = too much algae, 4 = lake looks bad, 5 = poor weather, 6 = litter/surface debris, 7 = too many lake users, 8 = other		
QF, QG	Health and safety issues today (QF) and past week (QG); 0 = none, 1 = taste/odor, 2 = GI illness humans/animals, 3 = swimmers itch, 4 = algae blooms, 5 = dead fish, 6 = unusual animals, 7 = other		
HAB form, Shore HAB	HAB evaluation; A = spilled paint, B = pea soup, C = streaks, D = green dots, E = bubbling scum, F = green/brown tint, G = duckweed, H = other, I = no bloom		

Appendix B- Monthly Evaluation of Findley Lake Data, 2006-2013

June Data

	2006	2007	2008	2009	2010	2011	2012	2013
Zsd	NORMAL	NORMAL	NORMAL	HIGH	HIGH		NORMAL	NORMAL
TP	LOW	NORMAL	NORMAL	LOW	NORMAL		NORMAL	NORMAL
Chl.a	NORMAL	NORMAL	LOW	NORMAL	NORMAL		NORMAL	NORMAL
NOx	NORMAL	NORMAL	HIGH	LOW	NORMAL		NORMAL	NORMAL
NH4	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL		NORMAL	NORMAL
TN	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL		NORMAL	NORMAL
pH	NORMAL	HIGH	NORMAL	NORMAL	NORMAL		NORMAL	NORMAL
SpCond	NORMAL	NORMAL	NORMAL	NORMAL	HIGH		NORMAL	NORMAL
Color	NORMAL	NORMAL	HIGH	NORMAL	NORMAL		NORMAL	NORMAL
Ca	LOW	LOW	NORMAL	NORMAL	NORMAL		LOW	
QA		NORMAL	NORMAL	LOW	LOW		LOW	NORMAL
QB	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL		NORMAL	NORMAL
QC		NORMAL	LOW	NORMAL	LOW		NORMAL	NORMAL
TH20	NORMAL	NORMAL	NORMAL	NORMAL	LOW		NORMAL	NORMAL

High = average monthly reading > 90th percentile reading for lake, 2000-2010
Low = average monthly reading < 10th percentile reading for lake, 2000-2010
Normal = average monthly reading between 10th and 90th percentile reading for lake, 2000-2010

July Data

	2006	2007	2008	2009	2010	2011	2012	2013
Zsd	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
TP	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
Chl.a	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
NOx	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
NH4	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	LOW	NORMAL	
TN	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
pH	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	
SpCond	HIGH	NORMAL	NORMAL	LOW	NORMAL	LOW	LOW	
Color	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	NORMAL	NORMAL	
Ca						NORMAL		
QA	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
QB	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	HIGH	
QC	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	LOW	NORMAL	
TH20		NORMAL	NORMAL	NORMAL	NORMAL	HIGH	HIGH	

High = average monthly reading > 90th percentile reading for lake, 2000-2010
Low = average monthly reading < 10th percentile reading for lake, 2000-2010
Normal = average monthly reading between 10th and 90th percentile reading for lake, 2000-2010

August Data

	2006	2007	2008	2009	2010	2011	2012	2013
Zsd		LOW	NORMAL	NORMAL	LOW		LOW	
TP		HIGH	NORMAL	NORMAL	NORMAL		HIGH	
Chl.a		NORMAL	NORMAL	NORMAL	NORMAL		HIGH	
NOx		NORMAL	NORMAL	NORMAL	NORMAL		NORMAL	
NH4		HIGH	NORMAL	NORMAL	NORMAL		HIGH	
TN		NORMAL	NORMAL	NORMAL	NORMAL		HIGH	
pH		HIGH	NORMAL		NORMAL		NORMAL	
SpCond		NORMAL	NORMAL		NORMAL		NORMAL	
Color		HIGH	NORMAL		HIGH		NORMAL	
Ca		NORMAL	NORMAL		HIGH		LOW	
QA		NORMAL	NORMAL		NORMAL		NORMAL	
QB		NORMAL	NORMAL		NORMAL		NORMAL	
QC		NORMAL	NORMAL		NORMAL		NORMAL	
TH20		HIGH	NORMAL		NORMAL		HIGH	

High = average monthly reading > 90th percentile reading for lake, 2000-2010
Low = average monthly reading < 10th percentile reading for lake, 2000-2010
Normal = average monthly reading between 10th and 90th percentile reading for lake, 2000-2010

September Data

	2006	2007	2008	2009	2010	2011	2012	2013
Zsd		NORMAL	LOW	NORMAL	LOW		LOW	
TP		NORMAL	NORMAL	NORMAL	HIGH	HIGH	HIGH	
Chl.a		NORMAL	HIGH	NORMAL	HIGH	NORMAL	HIGH	
NOx		NORMAL	NORMAL	HIGH	NORMAL	NORMAL	NORMAL	
NH4		HIGH	HIGH	NORMAL	NORMAL	NORMAL	NORMAL	
TN		HIGH	NORMAL	NORMAL	HIGH	HIGH	NORMAL	
pH		NORMAL	NORMAL	LOW	NORMAL	NORMAL	LOW	
SpCond		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	
Color		NORMAL	NORMAL	NORMAL	HIGH	HIGH	NORMAL	
Ca								
QA		NORMAL	NORMAL	NORMAL	NORMAL		NORMAL	
QB		NORMAL	NORMAL	NORMAL	NORMAL		NORMAL	
QC		NORMAL	NORMAL	NORMAL	NORMAL		HIGH	
TH20		NORMAL	NORMAL	NORMAL	NORMAL		NORMAL	

High = average monthly reading > 90th percentile reading for lake, 2000-2010
Low = average monthly reading < 10th percentile reading for lake, 2000-2010
Normal = average monthly reading between 10th and 90th percentile reading for lake, 2000-2010

Appendix C: Priority Waterbody Listing for Findley Lake

Findley Lake (0202-0004) — Impaired Seg

Waterbody Location Information

Revised: 02/26/2007

Water Index No:	Pa-84- 2-P153			**Drain Basin:**	Allegheny River
Hydro Unit Code:	05010004/010	**Str Class:**	B		French Creek
Waterbody Type:	Lake			**Reg/County:**	9/Chautauqua Co. (7)
Waterbody Size:	307.1 Acres			**Quad Map:**	CLYMER (M-02-4)
Seg Description:	entire lake				

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
PUBLIC BATHING	Impaired	Known
Aquatic Life	Stressed	Known
RECREATION	Impaired	Known

Type of Pollutant(s)

Known: ALGAL/WEED GROWTH, D.O./OXYGEN DEMAND, NUTRIENTS (phosphorus)
Suspected: Problem Species
Possible: - - -

Source(s) of Pollutant(s)

Known: - - -
Suspected: AGRICULTURE, Habitat Modification
Possible: Failing On-Site Syst

Resolution/Management Information

Issue Resolvability: 1 (Needs Verification/Study (see STATUS))
Verification Status: 4 (Source Identified, Strategy Needed)
Lead Agency/Office: DOW/Reg9 **Resolution Potential:** Medium
TMDL/303d Status: 3a->1 ( )

Further Details

Public Bathing and other recreational uses in Findley Lake are considered to be impaired by nutrient enrichment and excessive aquatic plant growth. Impacts to the fishery have also been noted. These impairments are attributed to agricultural and other nonpoint runoff sources.

Findley Lake has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 1986 and continuing through 2005. The most recent 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. Samples collected as recently as 2002 thru 2004 suggest possible improving conditions toward the mesotrophic, or moderately productive, range. However phosphorus levels in the lake consistently exceed the state guidance values indicating impacted recreational uses. Transparency measurements regularly fall below what is minimally recommended for swimming beaches. Nutrient levels at the lake bottom are usually elevated suggesting the bottom waters are poorly oxygenated and contribute to increases in surface water nutrient levels throughout the summer. This deepwater oxygen deficit was recorded in the lake at least back to the 1930s. (DEC/DOW, BWAM/CSLAP, February 2006)

Public perception of the lake and its uses is also evaluated as part of the CSLAP program. These assessment also indicate recreational suitability of the lake to be somewhat unfavorable. The lake is described most frequently as "slightly" impacted

for most recreational uses. The lake itself is most often described as having "definite algal greenness," an assessment that is consistent with the perceived water quality conditions in the lake and its measured water quality characteristics. Assessments have noted that aquatic plants regularly grow to the lake surface. Aquatic plants are dominated by a mix of native and non-native species (though invasives may be on the decline) and have been cited as impacting recreational uses. (DEC/DOW, BWAM/CSLAP, February 2006)

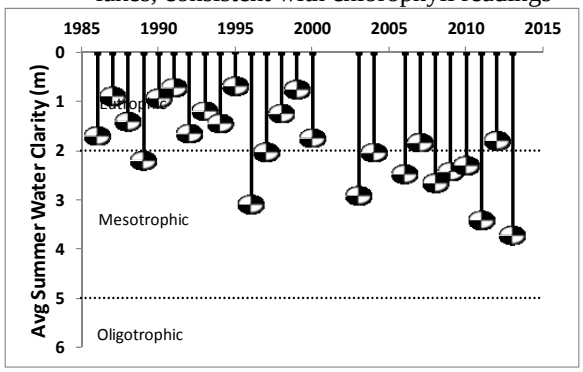
This lake waterbody is designated class B, suitable for use as a public bathing beach, general recreation and aquatic life support, but not as a water supply. Water quality monitoring by NYSDEC focuses primarily on support of general recreation and aquatic life. Samples to evaluate the bacteriological condition and bathing use of the lake or to evaluate contamination from organic compounds, metals or other inorganic pollutants have not been collected as part of the CSLAP monitoring program. Monitoring to assess public bathing use is generally the responsibility of state and/or local health departments.

Periodic low dissolved oxygen in parts of the lake has some impact the fishery and aquatic life support. However tiger muskie and walleye are stocked by NYSDEC, and the lake provides a good smallmouth bass and largemouth bass fishery. (DEC/DFWMR, Region 9, January 2007)

Appendix D- Long Term Trends: Findley Lake

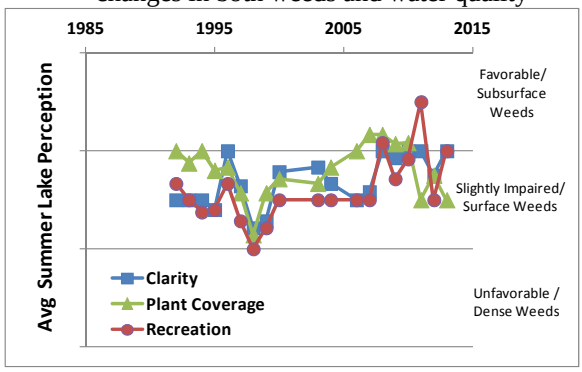
Long Term Trends: Water Clarity

- Slight clarity increase, but limited '13 data
- Most readings typical of *mesoeutrophic* lakes, consistent with chlorophyll readings



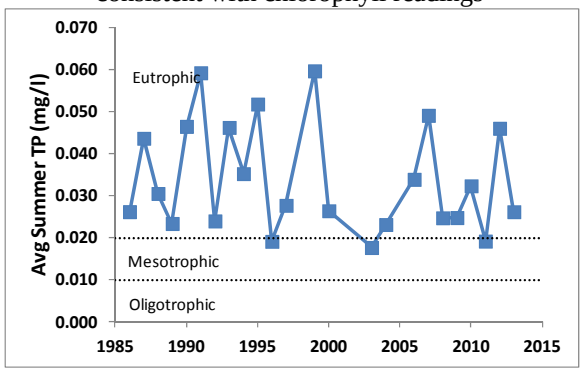
Long Term Trends: Lake Perception

- No clear trend in lake perception
- Recreational perception connected to changes in both weeds and water quality



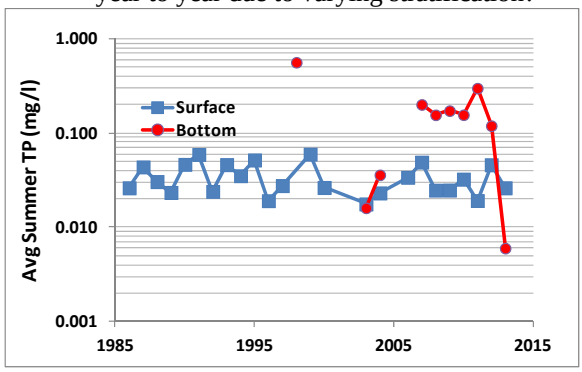
Long Term Trends: Phosphorus

- Highly variable from year to year
- Most readings typical of *eutrophic* lakes, consistent with chlorophyll readings



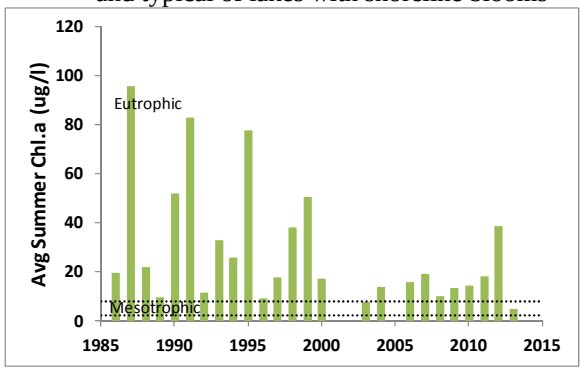
Long Term Trends: Bottom Phosphorus

- Elevated bottom TP most years
- Difference in surface and bottom TP from year to year due to varying stratification?



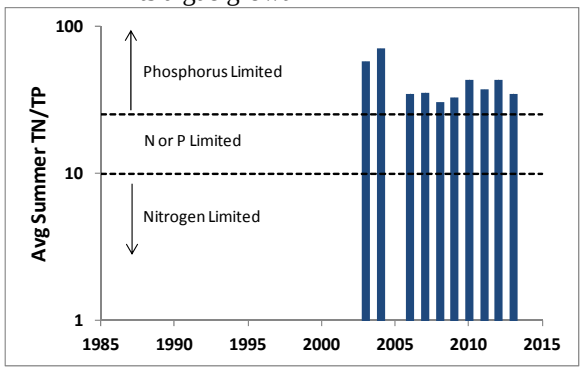
Long Term Trends: Chlorophyll a

- Slight decrease, but no clear trend
- Most readings typical of *eutrophic* lakes, and typical of lakes with shoreline blooms



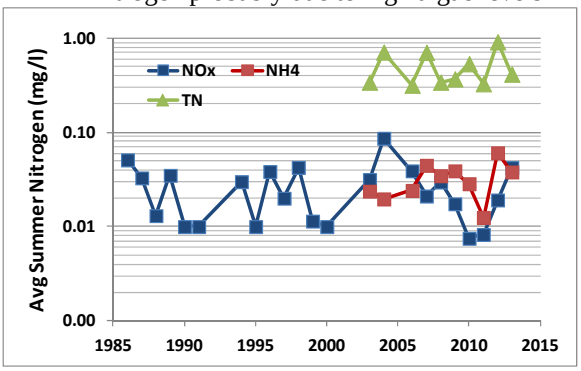
Long Term Trends: N:P Ratio

- No trends yet apparent
- Most readings indicate phosphorus likely limits algae growth



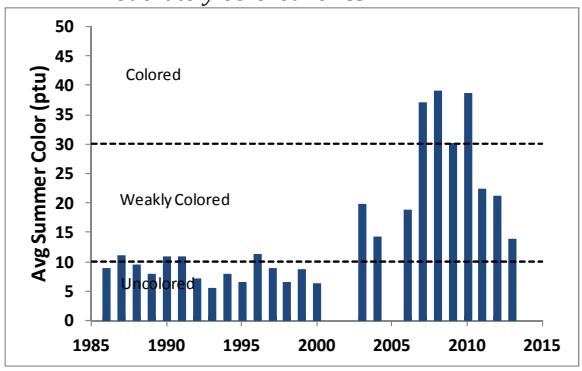
Long Term Trends: Nitrogen

- No trends apparent
- Low NOx and ammonia, but higher total nitrogen probably due to high algae levels



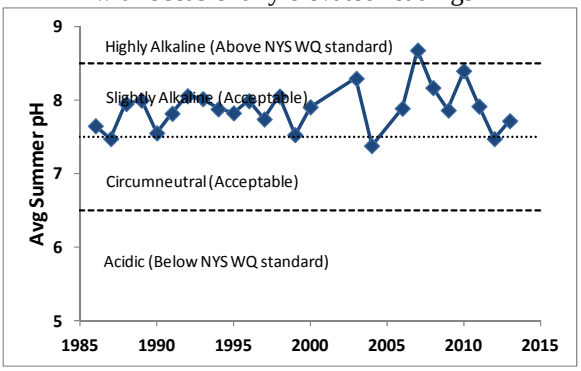
Long Term Trends: Color

- Recent decreases; higher readings post 2002
- Most readings typical of *weakly* to *moderately colored* lakes



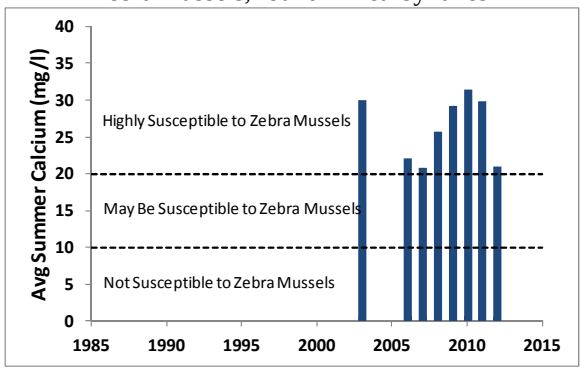
Long Term Trends: pH

- No long term trends apparent
- Most readings typical of *slightly alkaline* with occasionally elevated readings



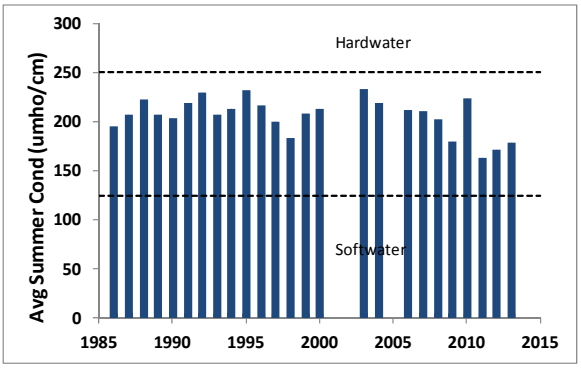
Long Term Trends: Calcium

- No trends yet apparent
- Most readings indicate high susceptibility to zebra mussels, found in nearby lakes



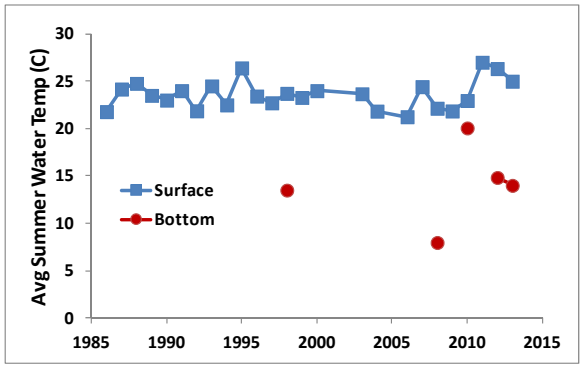
Long Term Trends: Conductivity

- No long term trends apparent
- Most readings typical of lakes with *intermediate* hardness



Long Term Trends: Water Temperature

- No long term trends apparent in surface T
- Variable bottom temperatures may indicate variable extent of thermal stratification



2013 Findley Lake Scorecard

Citizens Statewide Lake Assessment Program

Introduction

The Citizens Statewide Lake Assessment Program (CSLAP) is a volunteer lake monitoring and education program managed by DEC and the New York State Federation of Lake Associations (NYSFOLA). Lake information from a variety of sources, including CSLAP volunteers, is combined to create a scorecard for each CSLAP lake.

The purpose of the scorecard is to provide a quick and simple summary of sampling results for:

- water quality conditions
- biological health
- lake perception
- lake uses

The condition of each lake characteristic is represented by a color scale:

No color indicates the condition is not known due to insufficient data.

How information is turned into scores

CSLAP volunteers collect valuable lake water quality data using accepted scientific methods to evaluate nutrient enrichment, aquatic weed and algae growth, general lake conditions, and the recreational quality of a lake.

Water quality data is grouped and assigned scores related to the "health" (good or poor) of the lake. The scoring system is based on water quality standards, scientific principles and statistical analysis.

Tips for interpreting scorecard information

Each section of the scorecard includes a table identifying and describing lake characteristics and generally explains what they tell us about the lake's health. This table can be used to help interpret scorecard results.

Limitations of the information

Water quality assessments and summaries of lake perception provided in this scorecard are based on information collected by CSLAP, and could be different from assessments and summaries based on information collected by other sources.

Trend information (the positive or negative direction of lake health over time) is not available for every lake characteristic. Many years of data are needed to accurately assess trends. Trends are evaluated using statistical methods that are based on annual measurements. These methods separate short-term changes from long-term patterns, meaning a change from normal conditions in any one year may not represent a trend.

Biological health evaluations come from a variety of sources, including CSLAP. These evaluations will change as CSLAP biological data continues to be evaluated and as additional non-CSLAP information is provided to DEC and incorporated into the database.

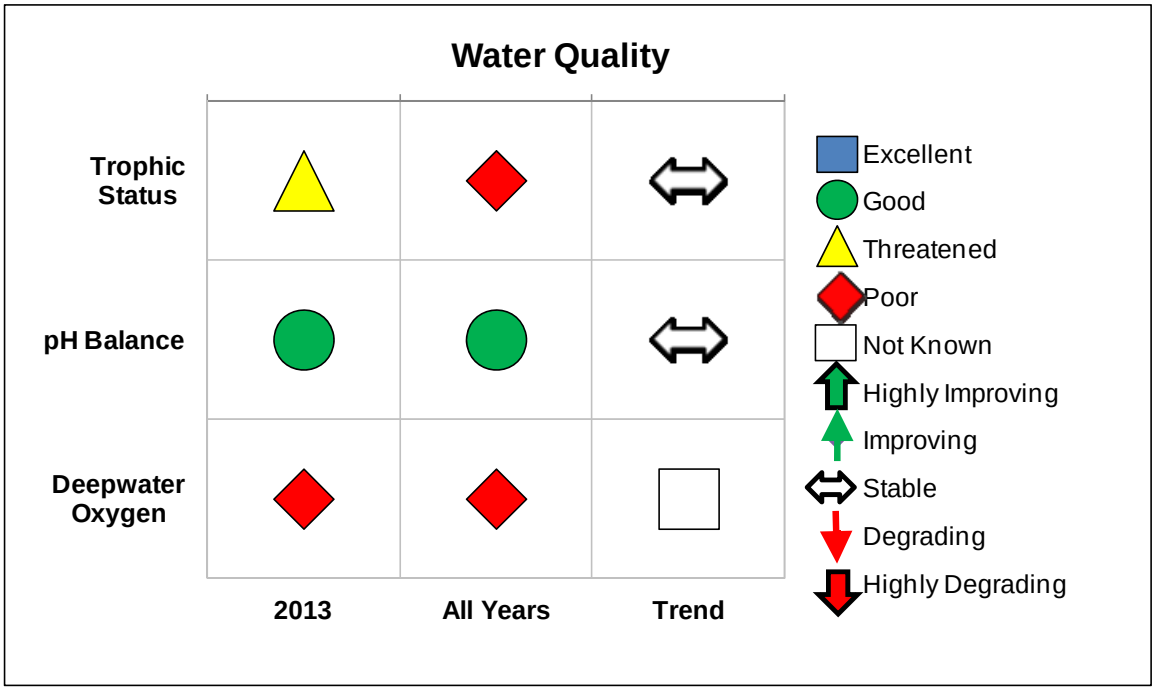
Lake use assessments are made using state water quality standards and guidance values for a variety of water quality and use indicators, not just CSLAP data. Lake use assessments based solely on CSLAP data are incomplete.

2013 Findley Lake Scorecard

Citizens Statewide Lake Assessment Program

Water Quality Assessment

Water quality assessments are based on data collected from the deepest part of the lake every other week, for 15 weeks, from late spring through early fall. The data is used to evaluate a number of lake conditions, including algae growth (productivity or trophic status), pH and deepwater dissolved oxygen levels. There is not enough data to identify a trend in the deepwater oxygen levels for any CSLAP lake.



*All years of CSLAP data collection for the lake except those for which data was not available.

The following data is collected and analyzed to determine the water quality score.

Water quality characteristic	Measured by	Description of characteristic	What it means
Trophic Status	Total Phosphorus (TP)	TP is measured because it is an important nutrient that often controls the growth of algae and rooted plants.	Too much phosphorus can harm aquatic life, water supplies, and recreational uses by causing excessive algae growth.
	Chlorophyll *a*	Chlorophyll *a* is measured to estimate the amount of algae in a lake.	The amount of chlorophyll *a* is usually closely related to the amount of phosphorus and can affect water clarity.
	Secchi Disk	This is a device to measure how far down into the water you can see.	Water clarity is a strong indicator of the public's opinion of lake conditions.
pH Balance	pH	Water pH is measured to determine its acidity or alkalinity.	Values between 6 and 9 support most types of plant and animal life.
	Conductivity	Conductivity is measured to estimate the amount of dissolved and suspended solids in water, including salts and organic material.	High conductivity values may be related to geology or land use practices and can indicate susceptibility to changes in pH.
Deepwater Dissolved Oxygen	Phosphorus, ammonia, nitrite, iron, manganese, and arsenic	Dissolved oxygen (DO) is not measured directly, but can be inferred from the levels of certain chemicals in water samples collected near the lake bottom.	Dissolved oxygen is critical for the ecological balance of lakes. Low DO in bottom waters can affect the survival of fish and lake organisms and cause chemical changes in lakes.

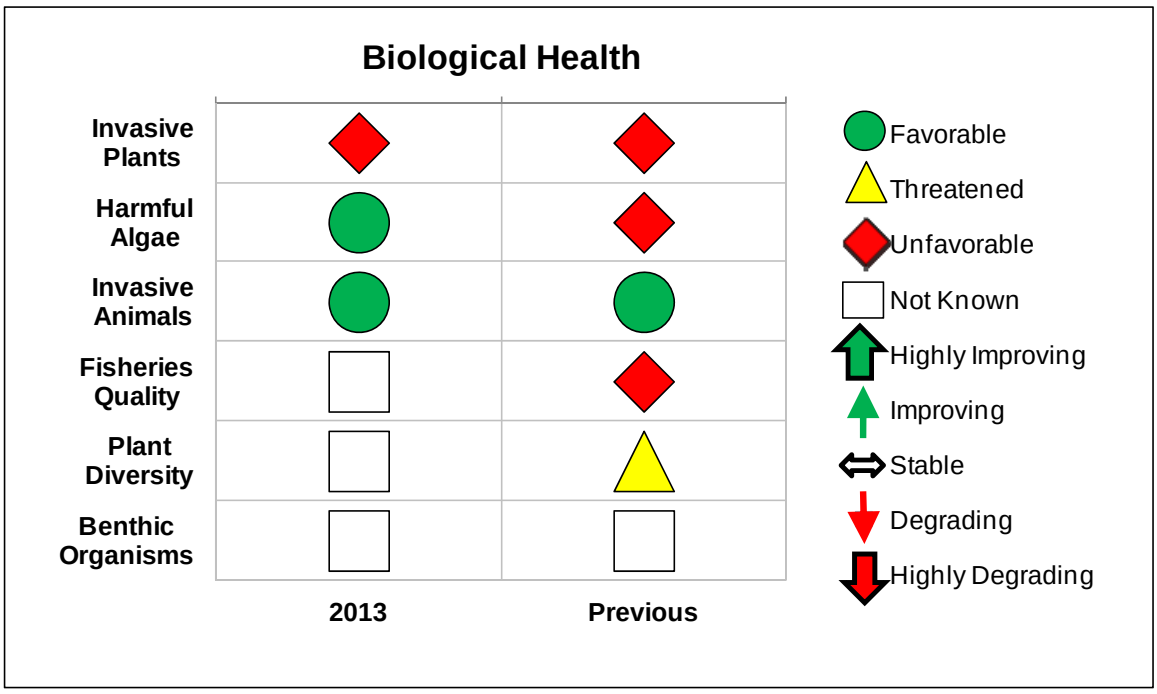
2013 Findley Lake Scorecard

Citizens Statewide Lake Assessment Program

Biological Health

Biological health of lakes can be evaluated in a number of ways. For CSLAP lakes, biological health evaluations are based on the presence of invasive plants, the type and number of blue-green harmful algal blooms, the presence of invasive animals (zebra mussels, spiny waterflea, etc.), the types of fish, aquatic plant diversity, and the number of pollution sensitive aquatic insects.

Biotic indices have been developed to evaluate a few biological health characteristics. Biotic indices are used to compare the biological community of the lake being sampled to the biological community of a known high-quality lake. (Data to support biological health assessments is not available for all CSLAP lakes.)



* All years of CSLAP data collection for the lake except those for which data was not available.

2013 Findley Lake Scorecard

Citizens Statewide Lake Assessment Program

The following information is used to determine biological health scores.

Biological Health Characteristic	Description of characteristic	What it means
Invasive Plants	CSLAP volunteers survey lakes for nuisance, non-native plants (water chestnut, Eurasian water milfoil, etc.).	Abundant invasive plants can crowd out native and protected plants, create quality problems, and interfere with recreation. "Unfavorable" means at least one invasive plant species has been found. "Threatened" lakes are geographically close to an "infected" lake, or have water quality conditions that put them at higher risk for species invasion.
Harmful Algae	DEC and other biologists screen water samples for blue-green algae cell pigments and also test them for algal toxins.	Harmful algae can reduce oxygen levels and may cause harm to people recreating on the lake. "Unfavorable" means algal toxin readings are unsafe for water recreation; "threatened" means readings are approaching unsafe for water recreation.
Invasive Animals	DEC and other biologists survey lakes for nuisance, non-native animals (zebra mussels, spiny water flea, etc.).	Abundant invasive animals can harm native plant and animal species, influence the likelihood of algal blooms, and interfere with recreation. "Unfavorable" means at least one invasive animal has been found. "Threatened" lakes are geographically close to an "infected" lake, or have water quality conditions that put them at higher risk for species invasion.
Fisheries Quality	DEC and other fisheries biologists measure the length and weight of various species in a lake's fish community and conduct other measures of the health of the fisheries community.	Better fisheries quality indicates the lake has sufficient food resources and habitat to support its fish community. Several "biotic indices" are used to evaluate fish community quality.
Plant Diversity	CSLAP volunteers, academic researchers and consultants survey lakes for the number and types of aquatic plants.	Higher plant diversity indicates a more natural environment and helps prevent invasive species from taking over a lake. "Floristic quality indices" are used to evaluate plant communities.
Benthic Organisms	DEC and other biologists count and identify the types of bottom living (benthic) aquatic insects in a lake.	More pollution sensitive (intolerant) aquatic insects in a lake usually indicate good water quality and suitable habitat. "Biotic indices" are used to evaluate benthic communities.

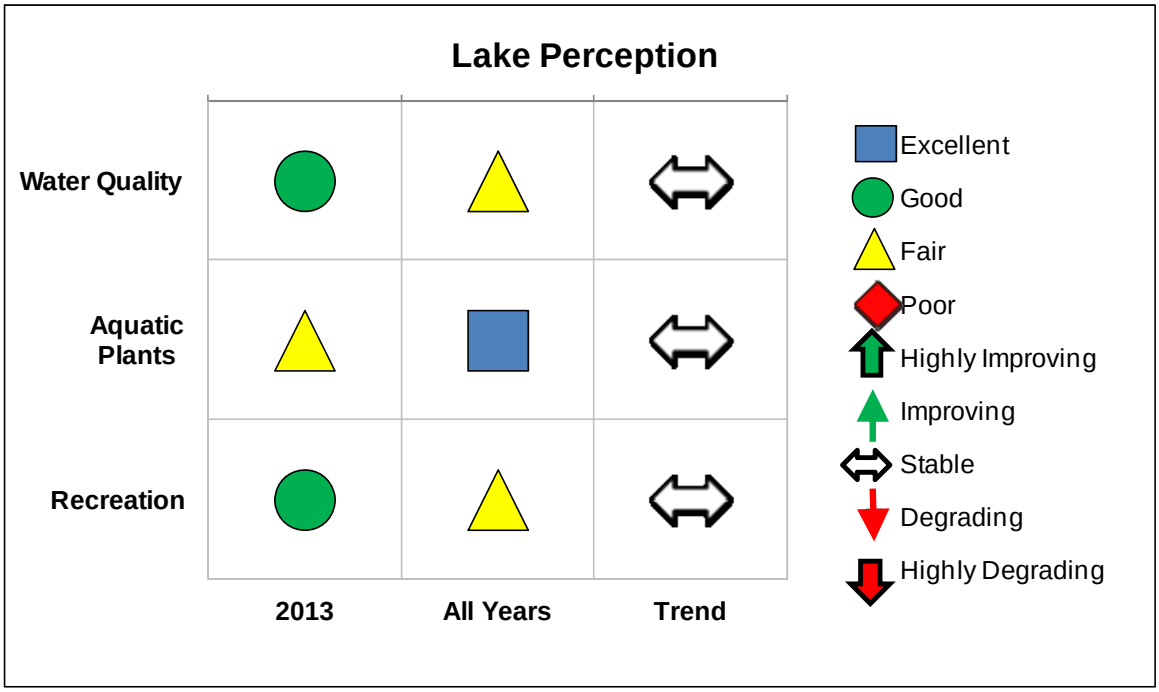
2013 Findley Lake Scorecard

Citizens Statewide Lake Assessment Program

Lake Perception

Lake perception scores are based on the visual observations of CSLAP volunteers who answer questions on the Field Observation Form (http://www.dec.ny.gov/docs/water_pdf/cslapsamobs.pdf) completed during sampling. The questions ask the volunteer to determine their perceptions of how clear the water looks, the abundance of aquatic plants, conditions affecting current recreational use, and the overall recreational quality of the lake.

Visual observations are very closely connected to measured water quality conditions. This information is helpful to lake managers in deciding on nutrient criteria, or the amount of nutrients that can flow into a lake without compromising its water quality. For New York State lakes, perception data collected by CSLAP volunteers is critical to the development of nutrient criteria (defining "how much is too much") and has been consistently collected by CSLAP volunteers since 1992.



***** All years of CSLAP data collection for the lake except those for which data was not available.

The following information is used to determine the lake perception scores.

Lake Perception Characteristic	Description of characteristic	What it means
Water Quality	Asks the user: How clear does the water look today?	Clearer water usually indicates lower nutrient levels.
Aquatic Plants	Asks the user: How abundant are aquatic plants where people are boating and swimming today?	Lower abundances of aquatic plants usually provide proper ecological balance and are less likely to contribute to recreational use problems, although the absence of plants can also lead to lake problems. Lakes with the most favorable assessments have some plants, but not too many plants.
Recreation	Asks the user: What is your opinion of the recreational quality of the lake? What factors affect your perception of the lake?	Users' perceptions are associated with water quality conditions and aquatic plant coverage. Positive responses usually indicate good water quality and little to no surface plant coverage. Negative responses are usually associated with poor water quality and/or invasive plants.

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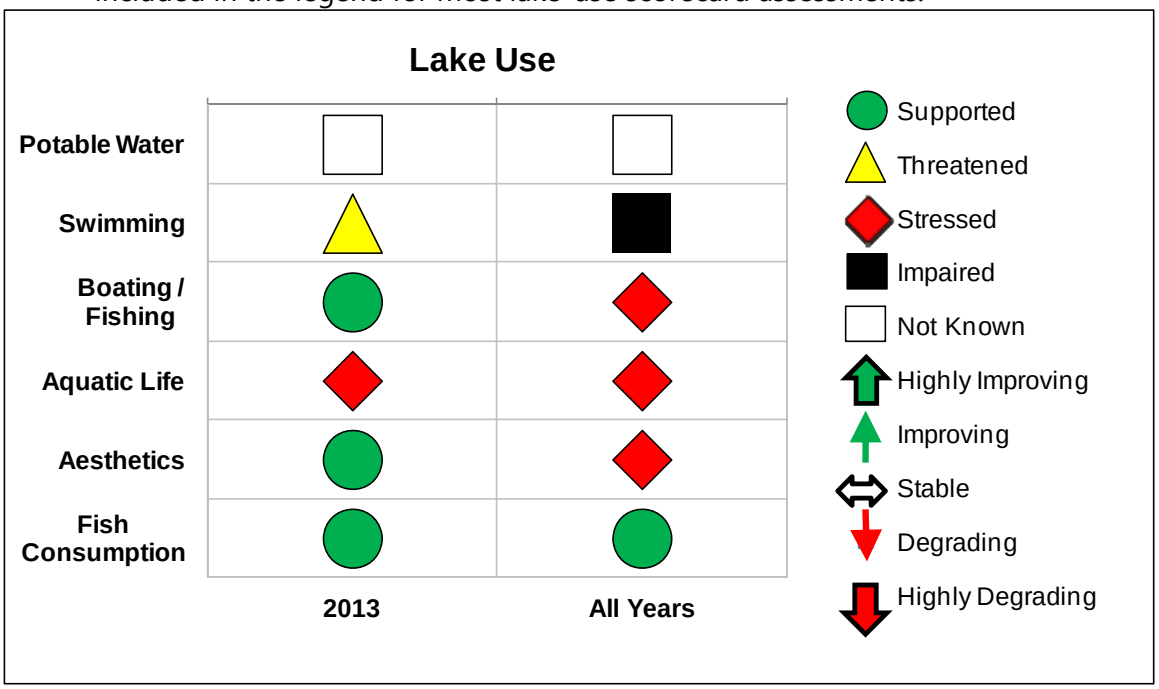
Lake Uses

Lake uses are defined as the best uses for a lake (drinking water, swimming, etc.) as determined by several factors. Lake uses are identified using CSLAP water quality, lake perception and biological assessment information to evaluate where a lake fits in the state Water Quality Standards and Classification system (see overview below).

Each lake use is scored based on the following assessment categories, using assessment methodology (http://www.dec.ny.gov/docs/water_pdf/asmtmeth09.pdf) established by DEC to evaluate impacts to lake uses:

- **Supported**- no evidence of impacts to lake use;
- **Threatened**- no evidence of impacts to lake use, but some factor threatens this use (for example, changing water quality, conditions that are nearing impact levels, land-use changes, etc.);
- **Stressed**- occasional or slight impacts to lake use;
- **Impaired**- frequent or persistent conditions limit or restrict lake use; and
- **Precluded**- conditions prevent lake use. This category is uncommon in NYS (and CSLAP) lakes and is not included in the legend for most lake-use scorecard assessments.



***** All years of CSLAP data collection for the lake except those for which data was not available.

Overview of the typical water quality classification and their best uses. For more information visit www.dec.ny.gov/regs/4592.html#15990

Best use	Other uses	Water Quality Classification
Drinking	Swimming, fishing, and fish, shellfish and wildlife reproduction and survival	Class AA & A
Swimming	Fishing, and fish, shellfish and wildlife reproduction and survival	Class B
Fishing	Swimming, and fish, shellfish and wildlife reproduction and survival	Class C
Fishing	Swimming, and fish, shellfish, and wildlife survival	Class D

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The following information is used to determine the condition of lake uses.

Lake Perception Characteristic	Description of characteristic	How this relates to CSLAP
Potable Water	The lake is used for drinking water. Only Class AA and A lakes have been approved for this use.	CSLAP data is not intended to assess the condition of potable water. Other state and local monitoring programs better address this use. However, some CSLAP parameters–chlorophyll *a*, ammonia, arsenic, iron, manganese, algal toxins–indicate potential impacts to potability.
Swimming	The lake is used for swimming and contact recreation. Even though some lakes are not classified for this use, all CSLAP lakes should support this use consistent with the federal goal to make all lakes "swimmable."	Several CSLAP sampling indicators–water clarity, chlorophyll *a,* algal toxins, lake perception–can be used to assess swimming conditions.
Boating/Fishing	The lake is used for boating, fishing and non-contact recreation. Even though some lakes are not classified for this use, all CSLAP lakes should support this use, consistent with the federal goal to make all lakes "fishable."	Non-contact recreation is evaluated using the lake perception data (visual observations) and aquatic plant surveys.
Aquatic Life	The lake is used by aquatic life. This is not an official "use" designated by New York State, but water quality standards and other criteria are adopted to protect aquatic life.	Aquatic life impacts can be evaluated by a number of CSLAP indicators, including pH, dissolved oxygen, and the presence of invasive species.
Aesthetics	The lake is used for visual enjoyment or the visual beauty of the lake. This is not an official "use" designated by New York State, but water quality standards and other criteria are adopted to protect aesthetics.	Lake aesthetics can be impacted by a number of factors, including algal blooms, nuisance weeds, or simply reports that "the lake looks bad," all of which are evaluated in CSLAP.
Fish Consumption	The lake is used for consumption of fish. All lakes are assumed to support this use unless otherwise indicated.	CSLAP does not collect data or information to evaluate fish consumption. All CSLAP lakes are evaluated against the New York State Department of Health: Health Advice on Eating Fish You Catch (http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/).

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Summary
The information displayed in the scorecard is intended to give a quick and comprehensive overview of the results from CSLAP assessments and lake data collected by DEC, academics and private consultants.

CSLAP scorecards summarize information related to water quality, lake perception, biological condition and lake uses. The data and other information collected through CSLAP, or other sources, contribute to the evaluation of lake uses.

This information is the basis for the water quality assessments conducted as part of DEC's waterbody inventory. More comprehensive summaries of CSLAP data are included in individual lake reports and regional and statewide CSLAP data summaries. To fully understand CSLAP lakes, those interested should review the information found in scorecards, individual lake summaries, and regional and statewide CSLAP reports.

CSLAP individual lake reports can be found on the Water Reports by County page of DEC's website (http://www.dec.ny.gov/lands/77821.html). Historical reports and regional lake reports are available on the New York State Federation of Lake Associations website (http://nysfola.mylaketown.com/).

More information about CSLAP and NYS Lakes
Many resources are available to lake associations and citizens interested in lake management and ecology on DEC's website, including:

- Information about CSLAP history, sampling activities, forms, and lake association resources are available on DEC's Citizens Statewide Lake Assessment Program web page (http://www.dec.ny.gov/chemical/81576.html).
- Measured water quality variable fact sheets (http://www.dec.ny.gov/docs/water_pdf/cslaplkpara.pdf)
- Lake management publication, *Diet for a Small Lake* (http://www.dec.ny.gov/chemical/82123.html)
- DEC Google Maps and Earth data, including CSLAP Lakes (http://www.dec.ny.gov/pubs/42978.html)
- Boating in NYS (http://www.dec.ny.gov/outdoor/349.html)
- Fishing in NYS (http://www.dec.ny.gov/outdoor/fishing.html)
- Freshwater Fishes of NY (http://www.dec.ny.gov/animals/269.html)
- Lake Contour Maps (http://www.dec.ny.gov/outdoor/9920.html)
- NYS Watersheds, Lakes and Rivers (http://www.dec.ny.gov/lands/26561.html)
- Fish Health Advisories (http://www.dec.ny.gov/outdoor/7736.html)
- Routine Statewide Monitoring Program (water quality monitoring programs) (http://www.dec.ny.gov/chemical/23848.html)
- Common Aquatic Invasive Species of NY (http://www.dec.ny.gov/animals/50272.html)