NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation


# Making Sense of CSLAP Reports

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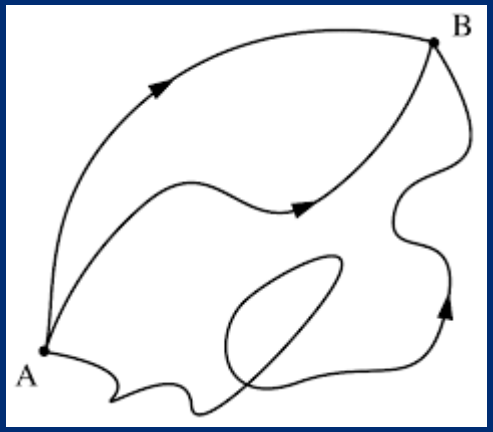
# How we got here….




1986-1995: Statewide report with short summary for each lake

1996-2008: More detailed lake reports not meeting DEC web criteria

2009-2014: Present report format developed

Reports on FOLA website each year as static PDF

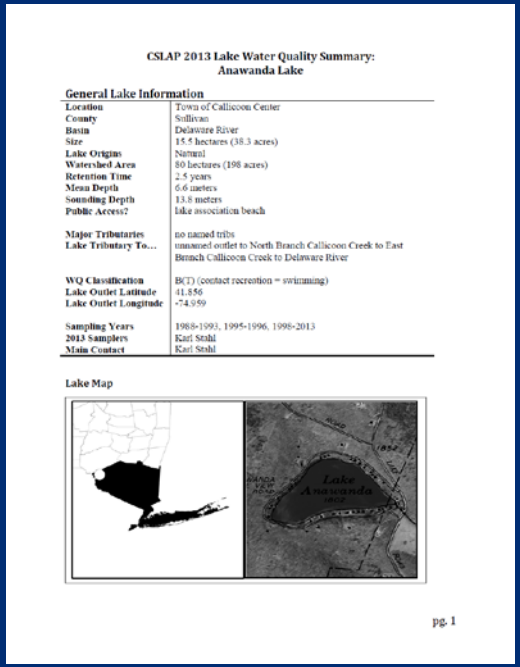
Only most recent report provided on DEC webpage

- Space issues
- Listed/available by county

No regional reports since 2009

No statewide report since 2010

# CSLAP Report



**CSLAP 2013 Lake Water Quality Summary:**
**Anawanda Lake**

**General Lake Information**

| | |
|---|---|
| **Location** | Town of Callicoon Center |
| **County** | Sullivan |
| **Basin** | Delaware River |
| **Size** | 15.5 hectares (38.3 acres) |
| **Lake Origins** | Natural |
| **Watershed Area** | 80 hectares (198 acres) |
| **Retention Time** | 2.5 years |
| **Mean Depth** | 6.6 meters |
| **Sounding Depth** | 13.8 meters |
| **Public Access?** | lake association beach |
| **Major Tributaries** | no named tribs |
| **Lake Tributary To…** | unnamed outlet to North Branch Callicoon Creek to East Branch Callicoon Creek to Delaware River |
| **WQ Classification** | B(T) (contact recreation = swimming) |
| **Lake Outlet Latitude** | 41.856 |
| **Lake Outlet Longitude** | -74.959 |
| **Sampling Years** | 1988-1993, 1995-1996, 1998-2013 |
| **2013 Samplers** | Karl Stahl |
| **Main Contact** | Karl Stahl |

**Lake Map**

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- One per lake
- Written by DEC for lake assns, govt, others
- Common format
  - Background information
  - Evaluation of indicators
  - Waterbody assessment
  - Tables and graphs
  - Raw data
  - Appendices
- Built from field and lab data sent to DEC Dec-Jan
- Issued Jan-April

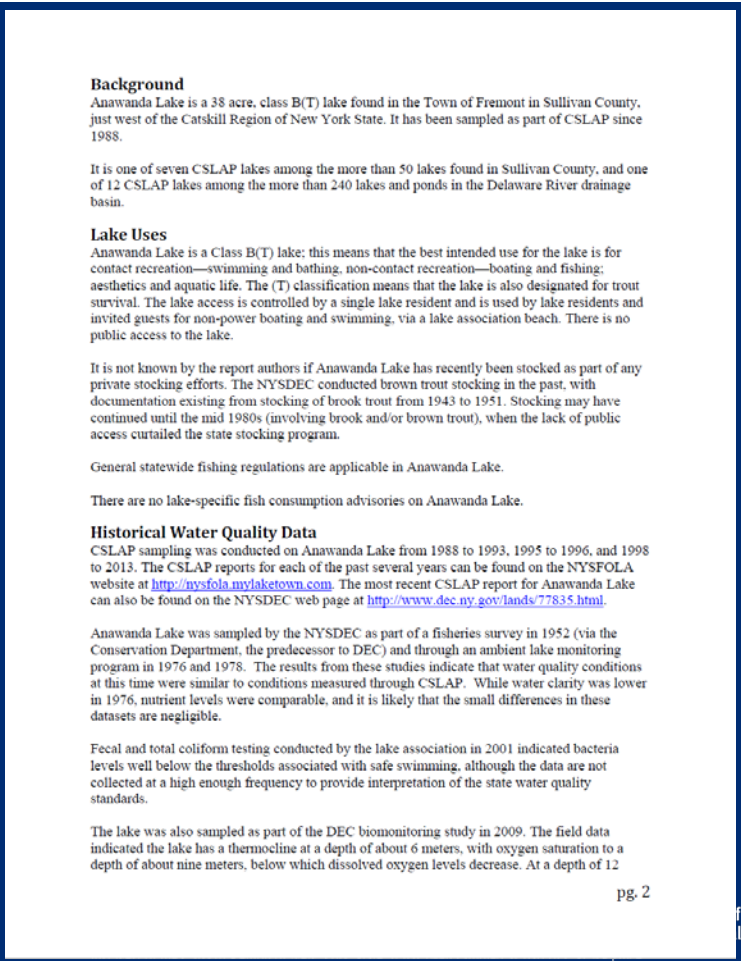
Background

Lake Uses

- Classification
- Access
- Fisheries/stocking

Historical WQ Data

- CSLAP
- Other DEC/state/govt
- Academic
- Process for getting info?



**Background**

Anawanda Lake is a 38 acre, class B(T) lake found in the Town of Fremont in Sullivan County, just west of the Catskill Region of New York State. It has been sampled as part of CSLAP since 1988.

It is one of seven CSLAP lakes among the more than 50 lakes found in Sullivan County, and one of 12 CSLAP lakes among the more than 240 lakes and ponds in the Delaware River drainage basin.

**Lake Uses**

Anawanda Lake is a Class B(T) lake; this means that the best intended use for the lake is for contact recreation—swimming and bathing, non-contact recreation—boating and fishing; aesthetics and aquatic life. The (T) classification means that the lake is also designated for trout survival. The lake access is controlled by a single lake resident and is used by lake residents and invited guests for non-power boating and swimming, via a lake association beach. There is no public access to the lake.

It is not known by the report authors if Anawanda Lake has recently been stocked as part of any private stocking efforts. The NYSDEC conducted brown trout stocking in the past, with documentation existing from stocking of brook trout from 1943 to 1951. Stocking may have continued until the mid 1980s (involving brook and/or brown trout), when the lack of public access curtailed the state stocking program.

General statewide fishing regulations are applicable in Anawanda Lake.

There are no lake-specific fish consumption advisories on Anawanda Lake.

**Historical Water Quality Data**

CSLAP sampling was conducted on Anawanda Lake from 1988 to 1993, 1995 to 1996, and 1998 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 for Anawanda Lake can also be found on the NYSDEC web page at http://www.dec.ny.gov/lands/77835.html.

Anawanda Lake was sampled by the NYSDEC as part of a fisheries survey in 1952 (via the Conservation Department, the predecessor to DEC) and through an ambient lake monitoring program in 1976 and 1978. The results from these studies indicate that water quality conditions at this time were similar to conditions measured through CSLAP. While water clarity was lower in 1976, nutrient levels were comparable, and it is likely that the small differences in these datasets are negligible.

Fecal and total coliform testing conducted by the lake association in 2001 indicated bacteria levels well below the thresholds associated with safe swimming, although the data are not collected at a high enough frequency to provide interpretation of the state water quality standards.

The lake was also sampled as part of the DEC biomonitoring study in 2009. The field data indicated the lake has a thermocline at a depth of about 6 meters, with oxygen saturation to a depth of about nine meters, below which dissolved oxygen levels decrease. At a depth of 12

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meters, the lake becomes anoxic. The water chemistry conditions are comparable to those measured through CSLAP, and also show low levels of metals, chloride and other water quality indicators. This suggests little impact from road salting of runoff to the lake. The biological samples from the lake will be analyzed during the winter of 2013-14.

None of the unnamed ephemeral tributaries to the lake, nor the outlet of the lake, have been monitored through the NYSDEC Rotating Intensive Basins (RIBS) or stream biomonitoring programs.

### Lake Association and Management History

Anawanda Lake is served by the Anawanda Lake Owners Association. Management activities focus on preventing introduction of invasive species by restricting access and powered boat uses of the lake and by minimizing runoff and nutrient loading to the lake. The lake association is also involved in summer picnics and other social activities.

It is not known if the lake association maintains a web site.

### 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 – Anawanda Lake" section in Appendix D.

### Evaluation of Eutrophication Indicators

Secchi disk transparency readings were lower than normal in June, but close to normal during the rest of the year, and steadily increased through late summer, decreasing slightly in the fall. This is consistent with the seasonal change in 2013 for phosphorus and chlorophyll a, and is roughly similar to the long-term seasonal pattern in these indicators, particularly phosphorus. Phosphorus readings have decreased slightly since CSLAP sampling first began in 1988, although most of that decrease occurred from the early 1990s to the early 2000s. Deepwater phosphorus readings are higher than those measured at the lake surface, but these nutrients do not appear to migrate into the surface waters, at least during the summer growing season. The lake exhibited a small shoreline bloom in early summer (at the time when open water algae levels were at their highest and water clarity was at its lowest). The shoreline bloom was dominated by blue green algae, but did not show any toxicity. Shoreline samples collected later in the summer did not show any significant algae.

The lake can be characterized as *mesoligotrophic*, or moderately unproductive, based on water clarity, total phosphorus readings (both typical of *oligotrophic* lakes) and chlorophyll *a* readings (typical of *mesotrophic* lakes). The trophic state indices (TSI) evaluation suggests that each of these trophic indicators is "internally consistent"—each of these indicators is in the expected range given the readings of the other indicators. Overall trophic conditions are summarized on the Lake Scorecard and Lake Condition Summary Table.



Lake Assn info

- Drawn from historical info and web pages

Summary of results

- Listed by major category
- Differs by use assessments
- Listed in order of 'importance'
- Present, comparison to historical (long-term trends), seasonal trends
- Link to tables
- All writeups use previous reports narrative as basis (update)

Eutrophication indicators

- TP, Secchi, chl.a
- Surface and bottom (TP)
- Trophic assessment
- Comparison among indicators

Potable water indicators

- Chl.a/HAB surface
- Fe, Mn, As, NH4, TP bottom (less info in '14)

Limnological indicators

- Other sampled indicators
- Little overall assessment after yr 1 (deferred to table)

Biological indicators

- Algae from ESF- open/shore
- Zooplankton - little info on any CSLAP lakes
- Macrophytes- species count, list invasives, FQI
- Fish- broad categorization, fish IBI if enough info
- Macroinverts- little info- filled in when study complete
- Other AIS
- Missing info for many CSLAP lakes

**Evaluation of Potable Water Indicators**

Algae levels are not high enough to render the lake susceptible to taste and odor compounds or elevated DBP (disinfection by product) compounds that could affect the potability of the water, except perhaps for intakes directly within a shoreline bloom, and the lake is not used for drinking water. Deepwater phosphorus and ammonia readings are higher than those measured at the lake surface, but there is no indication of any impacts to "unofficial" deepwater intakes use. Potable water conditions, at least as measurable through CSLAP, are summarized in the Lake Scorecard and Lake Condition Summary Table.

**Evaluation of Limnological Indicators**

$NO_3$ readings were higher than normal in each of the last three years, particularly in early summer, though still fairly low, and color readings were higher than normal in 2011 and 2012. Each of the other limnological indicators was close to normal in 2013, and none of these limnological indicators has exhibited any clear long-term trends. It is likely that the small changes in each of these indicators have been within the normal range of variability in the lake. Nitrogen to phosphorus ratios show that algae growth is controlled by phosphorus rather than nitrogen, although these ratios have decreased slightly in recent years. Overall limnological conditions are summarized in the Lake Scorecard and Lake Condition Summary Table.

**Evaluation of Biological Condition**

The 1992 phytoplankton survey showed low biomass, and the algal community was dominated by golden brown algae and dinoflagellates. It is not known if this is representative of normal algal community structure for the lake. The 2013 fluoroprobe data indicates a relatively high percentage of blue green algae in some open water samples, although overall algae levels were usually very low and well below levels of concern. The shoreline bloom samples from 2013 showed high blue green algae levels at times, but toxicity was not measured in any sample.

Macrophyte surveys have been conducted through CSLAP and the 2009 biomonitoring study in Anawanda Lake. At least 12 aquatic plant species have been found, including at least one protected plant species (*Utricularia minor*, lesser bladderwort). The modified floristic quality index (FQI) for the lake indicates that the quality of the aquatic plant community is "excellent".

The macroinvertebrate results from the 2009 biomonitoring survey of the lake are not yet available.

The composition of the fish community is comprised of at least six warmwater fish species, at least two coolwater fish species, and at least two coldwater fish species. This suggests that the lake can most likely be characterized as a coldwater fishery, although the inventory of fish species in the lake is no doubt incomplete (and based on fish species identified in the 1950s). The 1952 netting results indicate that the quality of the fisheries is "fair", using the Minnesota fish biotic index.

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

**Evaluation of Lake Perception**

Recreational, water quality and aquatic plant assessments were close to normal in recent years, including 2013, consistent with relatively stable water quality conditions. None of the CSLAP

measures of lake perception (water quality assessments, aquatic plant coverage, and recreational assessments) has exhibited any clear long-term trends. Recreational assessments degrade slightly during the typical summer, consistent with the slight seasonal increase in lake productivity, although this seasonal change in lake perception was not apparent in 2013. The least favorable recreational use assessments in 2013 were in association with the shoreline bloom and slight increase in open water algae levels in early summer. Overall lake perception is summarized on the Lake Scorecard and Lake Condition Summary Table.

**Evaluation of Local Climate Change**

Water and air temperature readings in the summer index period were close to normal in 2013, and water temperature readings have not exhibited any clear long-term changes. 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 and fluoroprobe algae levels have been well below the levels indicating susceptibility for harmful algal blooms (HABs), and open water microcystis levels have been well below the thresholds for safe swimming. As noted earlier, the shoreline bloom sample in early summer showed high blue green algae levels, at a time when open water (away from shoreline) algae levels were slightly higher than earlier (or later) in the summer. This sample did not show any measureable toxins. A shoreline bloom sample from later in the summer showed neither bloom quantities of blue green algae nor toxins.



Lake perception

- WQ, weeds, recreation
- Long-term and seasonal
- Linked to WQ data
- % frequency rec linked to weeds / algae available

Local climate change

- Water temp only
- Long-term only (not seasonal)

Algal toxins

- Broad summary of phycocyanin, fluoroprobe, toxin data
- Open water and shoreline
- Compared to WHO values

Lake Condition table

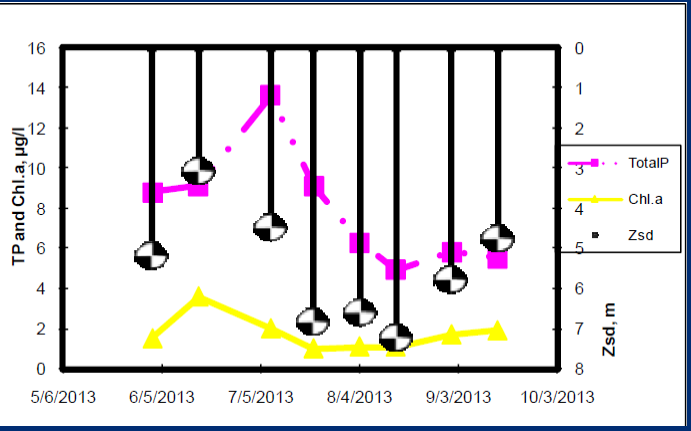
- Overall min, avg, max
- Present year avg
- Single word/phrase summary
- 2014 difference
  - Stock narrative based on algorithm
  - Not included for recent indicators (BGA), deepwater, biological indicators
- Long term change?
  - Requires 5 years of data
  - Might appear to conflict with 2014 change response
  - Stock narrative
  - Not included for recent indicators (BGA), deepwater, biological indicators

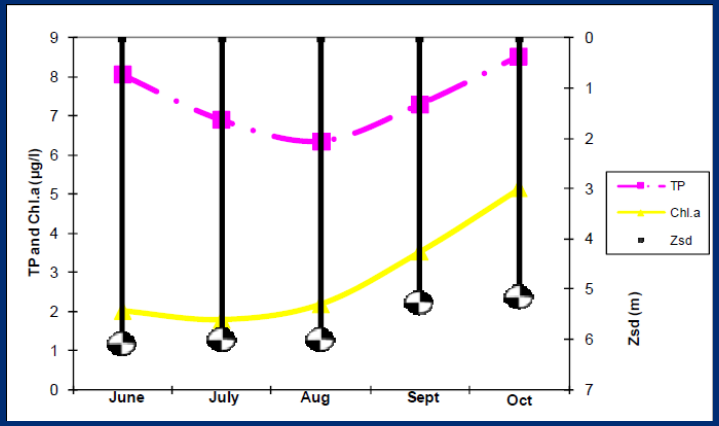
**Lake Condition Summary**

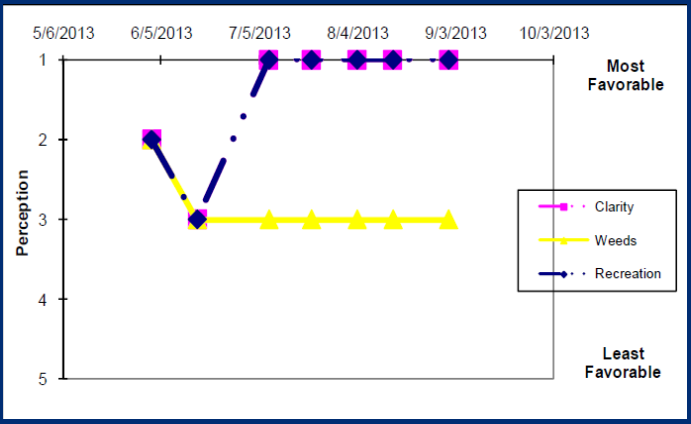
| Category | Indicator | Min | 88-13 Avg | Max | 2013 Avg | Classification | 2013 Change? | Long-term Change? |
|---|---|---|---|---|---|---|---|---|
| Eutrophication Indicators | Water Clarity | 2.00 | 5.80 | 13.60 | 5.51 | Oligotrophic | Within Normal Range | No Change |
| | Chlorophyll *a* | 0.06 | 2.49 | 17.80 | 1.74 | Mesotrophic | Within Normal Range | No Change |
| | Total Phosphorus | 0.001 | 0.007 | 0.019 | 0.008 | Oligotrophic | Within Normal Range | No Change |
| Potable Water Indicators | Hypolimnetic Ammonia | 0.02 | 0.35 | 0.86 | 0.22 | Elevated Deepwater NH4 | Lower Than Normal | Not known |
| | Hypolimnetic Arsenic | | | | | | | Not known |
| | Hypolimnetic Iron | | | | | | | Not known |
| | Hypolimnetic Manganese | | | | | | | Not known |
| Limnological Indicators | Hypolimnetic Phosphorus | 0.004 | 0.035 | 0.131 | 0.015 | Close to Surface TP Readings | Lower Than Normal | Not known |
| | Nitrate + Nitrite | 0.00 | 0.02 | 0.19 | 0.04 | Low NOx | Higher than Normal | No Change |
| | Ammonia | 0.00 | 0.03 | 0.28 | 0.03 | Low Ammonia | Within Normal Range | No Change |
| | Total Nitrogen | 0.05 | 0.32 | 0.98 | 0.23 | Low Total Nitrogen | Within Normal Range | No Change |
| | pH | 5.20 | 7.36 | 8.78 | 7.55 | Circumneutral | Within Normal Range | No Change |
| | Specific Conductance | 29 | 59 | 191 | 69 | Softwater | Within Normal Range | No Change |
| | True Color | 0 | 5 | 20 | 7 | Uncolored | Within Normal Range | No Change |
| | Calcium | 0.8 | 4.6 | 7.2 | 4.5 | Not Susceptible to Zebra Mussels | Within Normal Range | No Change |
| Lake Perception | WQ Assessment | 1 | 1.8 | 3 | 1.4 | Not Quite Crystal Clear | Within Normal Range | No Change |
| | Aquatic Plant Coverage | 1 | 2.7 | 3 | 2.9 | Surface Plant Growth | Within Normal Range | No Change |
| | Recreational Assessment | 1 | 1.6 | 4 | 1.4 | Excellent | Within Normal Range | No Change |
| Biological Condition | Phytoplankton | | | | | Open water-low blue green algae biomass; occasional shoreline blooms | Not known | Not known |
| | Macrophytes | | | | | Excellent quality of the aquatic plant community | Not known | Not known |
| | Zooplankton | | | | | Not measured through CSLAP | Not known | Not known |
| | Macroinvertebrates | | | | | 2009 results not yet available | Not known | Not known |
| | Fish | | | | | Coldwater fishery? | Not known | Not known |
| | Invasive Species | | | | | None observed | Not known | Not known |
| Local Climate Change | Air Temperature | 1 | 20.5 | 31 | 21.6 | | Within Normal Range | No Change |
| | Water Temperature | 6 | 21.1 | 28 | 22.5 | | Within Normal Range | No Change |

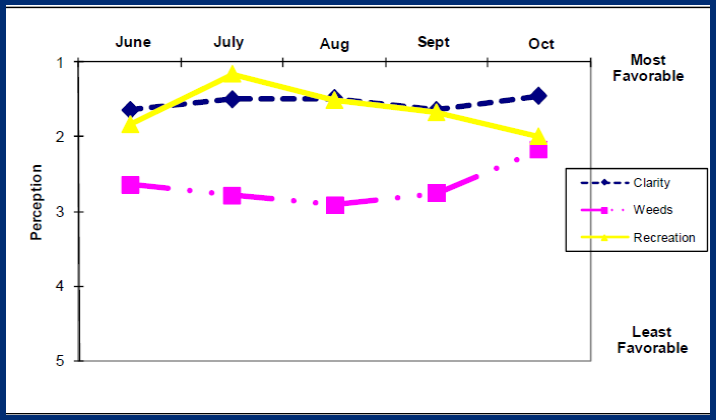
pg. 6

# Trophic/Perception Plots

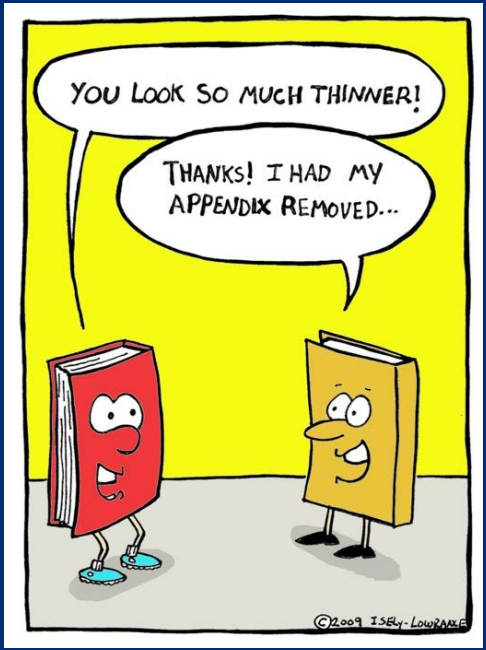


# Report Appendices




A – Raw data for all years, with legend

B – Priority Waterbody Listing (verbatim)

C – Long term trend graphs

D – Algae results at CSLAP site / blooms

E – AIS listings in county

F – Watershed and land use map

Learn more about D, E and F in other sessions today !!!!

**Appendix A- CSLAP Water Quality Sampling Results for Anawanda Lake**

| LNum | PName | Date | Zbot | Zsd | Zsamp | Tot.P | NO3 | NH4 | TDN | TN/TP | TColor | pH | Cond25 | Ca | Chl.a |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 53 | Anawanda L | 6/25/1988 | 13.7 | 6.71 | 1.5 | 0.012 | 0.01 | | | | 5 | 7.20 | 46 | | 2.81 |
| 53 | Anawanda L | 7/3/1988 | 13.7 | 7.56 | 1.5 | 0.009 | 0.01 | | | | 5 | 7.67 | 49 | | 1.06 |
| 53 | Anawanda L | 7/10/1988 | 13.7 | 7.47 | 1.5 | 0.007 | 0.01 | | | | 1 | 7.73 | 63 | | 2.15 |
| 53 | Anawanda L | 7/18/1988 | 13.7 | 7.24 | 1.5 | 0.007 | 0.01 | | | | 5 | 7.14 | 45 | | 0.87 |
| 53 | Anawanda L | 7/24/1988 | 13.7 | 7.39 | 1.5 | 0.005 | 0.01 | | | | 5 | 7.51 | 48 | | 0.99 |
| 53 | Anawanda L | 7/31/1988 | 13.7 | 6.89 | 1.5 | 0.013 | 0.01 | | | | 4 | 7.58 | 43 | | 1.42 |
| 53 | Anawanda L | 8/7/1988 | 14.3 | 6.71 | 1.5 | 0.013 | 0.01 | | | | 3 | 7.65 | 47 | | 2.07 |
| 53 | Anawanda L | 8/13/1988 | 14.3 | 7.68 | 1.5 | 0.006 | 0.01 | | | | 6 | 7.54 | 44 | | 1.32 |
| 53 | Anawanda L | 8/21/1988 | 14.3 | 6.55 | 1.5 | 0.006 | 0.01 | | | | 8 | 7.49 | 45 | | 1.53 |
| 53 | Anawanda L | 8/28/1988 | 13.7 | 6.68 | 1.5 | 0.003 | 0.01 | | | | 2 | 6.49 | 47 | | 1.70 |
| 53 | Anawanda L | 9/5/1988 | 14.3 | 5.49 | 1.5 | 0.005 | 0.01 | | | | 2 | 6.93 | 43 | | 2.22 |
| 53 | Anawanda L | 9/11/1988 | 14.3 | 5.95 | 1.5 | 0.006 | 0.01 | | | | 2 | 7.65 | 42 | | 0.99 |
| 53 | Anawanda L | 9/18/1988 | 13.7 | 7.07 | 1.5 | 0.010 | 0.01 | | | | 8 | 7.56 | 47 | | 2.66 |
| 53 | Anawanda L | 9/25/1988 | 14.3 | 6.10 | 1.5 | 0.007 | 0.01 | | | | 3 | 7.82 | 63 | | 1.92 |
| 53 | Anawanda L | 10/1/1988 | 14.3 | 6.34 | 1.5 | 0.010 | 0.01 | | | | 6 | 7.53 | 48 | | 1.70 |
| 53 | Anawanda L | 6/18/1989 | 14.0 | 6.49 | 1.5 | 0.009 | 0.05 | | | | 5 | 7.02 | 45 | | 2.29 |
| 53 | Anawanda L | 7/4/1989 | 14.0 | 6.23 | 1.5 | 0.011 | | | | | 5 | | | | 0.90 |
| 53 | Anawanda L | 7/16/1989 | 14.0 | 6.98 | 1.5 | 0.006 | 0.03 | | | | 5 | 7.71 | 48 | | 1.56 |
| 53 | Anawanda L | 7/30/1989 | 14.0 | 7.18 | 1.5 | 0.012 | | | | | 2 | 7.66 | 48 | | 1.06 |
| 53 | Anawanda L | 8/13/1989 | 13.7 | 7.58 | 1.5 | 0.012 | 0.01 | | | | 6 | 7.82 | 48 | | 2.36 |
| 53 | Anawanda L | 8/27/1989 | 14.0 | 6.37 | 1.5 | 0.006 | | | | | 2 | 6.71 | 48 | | 1.57 |
| 53 | Anawanda L | 9/10/1989 | 14.0 | 5.73 | 1.5 | 0.009 | 0.01 | | | | 2 | 7.40 | 47 | | 1.77 |
| 53 | Anawanda L | 9/24/1989 | 14.0 | 4.21 | 1.5 | 0.013 | | | | | 3 | 6.99 | 50 | | 3.09 |
| 53 | Anawanda L | 7/1/1990 | 13.7 | 6.15 | 1.5 | 0.007 | 0.02 | | | | 3 | 7.08 | 48 | | 0.84 |
| 53 | Anawanda L | 7/22/1990 | 13.7 | 5.95 | 1.5 | | | | | | 4 | | 76 | | 1.86 |
| 53 | Anawanda L | 8/11/1990 | 13.7 | 5.95 | 1.5 | 0.005 | 0.01 | | | | 2 | 6.50 | 64 | | 3.28 |
| 53 | Anawanda L | 8/26/1990 | 13.7 | 4.27 | 1.5 | 0.012 | | | | | 6 | 6.48 | 53 | | 2.54 |
| 53 | Anawanda L | 9/8/1990 | 16.5 | 5.18 | 1.5 | 0.007 | 0.01 | | | | 8 | 7.54 | 51 | | 3.64 |
| 53 | Anawanda L | 9/25/1990 | 13.7 | 5.66 | 1.5 | 0.012 | 0.01 | | | | 9 | 7.85 | 50 | | 10.40 |
| 53 | Anawanda L | 9/30/1990 | 13.6 | 3.96 | 1.5 | 0.009 | 0.01 | | | | 6 | 7.83 | 50 | | |
| 53 | Anawanda L | 6/24/1991 | 14.0 | 5.68 | 1.5 | 0.012 | 0.01 | | | | 4 | 7.55 | 54 | | 2.44 |
| 53 | Anawanda L | 7/7/1991 | 14.0 | 5.79 | 1.5 | 0.013 | | | | | 3 | 6.92 | 54 | | 3.23 |
| 53 | Anawanda L | 7/21/1991 | 15.2 | 5.95 | 1.5 | 0.019 | 0.01 | | | | | | | | 3.75 |
| 53 | Anawanda L | 8/4/1991 | 16.8 | 5.56 | 1.5 | 0.009 | 0.01 | | | | 8 | 7.63 | 55 | | 4.73 |
| 53 | Anawanda L | 8/18/1991 | 14.0 | 5.98 | 1.5 | 0.007 | | | | | 6 | 7.74 | 54 | | 9.11 |
| 53 | Anawanda L | 9/2/1991 | 14.0 | 6.94 | 1.5 | 0.009 | | | | | 4 | 7.49 | 54 | | 3.81 |
| 53 | Anawanda L | 9/15/1991 | 14.0 | 6.11 | 1.5 | 0.010 | 0.01 | | | | 2 | 7.60 | 54 | | 10.00 |
| 53 | Anawanda L | 9/21/1991 | 13.5 | 5.88 | 1.5 | 0.008 | | | | | 4 | 7.55 | 55 | | 4.27 |
| 53 | Anawanda L | 6/14/1992 | 13.8 | 4.83 | 1.5 | 0.011 | 0.01 | | | | 3 | 7.70 | 59 | | 1.23 |
| 53 | Anawanda L | 6/28/1992 | 13.7 | 5.95 | 1.5 | 0.009 | | | | | 4 | 7.29 | 59 | | 3.52 |
| 53 | Anawanda L | 7/5/1992 | 13.8 | 4.93 | 1.5 | 0.010 | 0.01 | | | | 5 | 7.89 | 59 | | 2.67 |
| 53 | Anawanda L | 7/12/1992 | 13.7 | 5.88 | 1.5 | 0.009 | 0.01 | | | | 4 | 6.70 | 59 | | 1.80 |
| 53 | Anawanda L | 8/2/1992 | | 6.25 | 1.5 | 0.014 | 0.04 | | | | 2 | 7.38 | 58 | | 3.00 |
| 53 | Anawanda L | 8/16/1992 | | 5.52 | 1.5 | 0.009 | | | | | 3 | 7.46 | 58 | | |
| 53 | Anawanda L | 9/7/1992 | 13.7 | 4.66 | 1.5 | 0.012 | 0.01 | | | | 5 | 6.49 | 61 | | 15.00 |
| 53 | Anawanda L | 6/27/1993 | 13.8 | 5.02 | 1.5 | 0.011 | | | | | 2 | 7.62 | 59 | | 1.50 |
| 53 | Anawanda L | 7/25/1993 | 13.6 | 3.92 | 1.5 | 0.007 | | | | | 2 | 7.38 | 58 | | 2.38 |
| 53 | Anawanda L | 8/8/1993 | 13.7 | 4.60 | 1.5 | 0.006 | | | | | 2 | 7.44 | 59 | | 2.39 |
| 53 | Anawanda L | 8/29/1993 | 13.8 | 5.95 | 1.5 | 0.004 | | | | | 2 | 7.48 | 61 | | 1.52 |
| 53 | Anawanda L | 9/26/1993 | 13.7 | 4.24 | 1.5 | 0.009 | | | | | 2 | 7.37 | 59 | | 7.86 |
| 53 | Anawanda L | 7/2/1995 | 13.7 | 5.00 | 1.5 | 0.007 | | | | | 1 | 7.13 | 59 | | 1.13 |
| 53 | Anawanda L | 7/23/1995 | 13.7 | 2.65 | 1.5 | 0.007 | | | | | 5 | 7.38 | 58 | | 4.85 |
| 53 | Anawanda L | 8/12/1995 | 14.0 | 3.60 | 1.5 | 0.005 | | | | | 1 | 6.94 | 60 | | 6.94 |
| 53 | Anawanda L | 9/10/1995 | 13.4 | 3.00 | 1.5 | 0.007 | | | | | 5 | 7.04 | 60 | | 10.70 |
| 53 | Anawanda L | 10/1/1995 | 13.0 | 2.25 | 1.5 | 0.011 | | | | | 5 | 6.83 | 60 | | 8.25 |
| 53 | Anawanda L | 10/22/1995 | 13.0 | 2.00 | 1.5 | 0.014 | | | | | 1 | 7.11 | 56 | | 17.80 |
| 53 | Anawanda L | 7/7/1996 | 13.9 | 6.51 | 1.5 | 0.007 | | | | | 1 | 7.10 | 57 | | 2.80 |
| 53 | Anawanda L | 7/29/1996 | 14.2 | 6.25 | 1.5 | 0.007 | | | | | 5 | 7.05 | 55 | | 2.40 |
| 53 | Anawanda L | 8/25/1996 | 13.6 | 5.85 | 1.5 | 0.009 | | | | | 20 | 7.22 | 57 | | 3.50 |
| 53 | Anawanda L | 9/21/1996 | 14.2 | 3.30 | 1.5 | 0.009 | | | | | 5 | 6.93 | 56 | | |
| 53 | Anawanda L | 10/12/1996 | 14.3 | 3.04 | 1.5 | 0.009 | | | | | 2 | 7.14 | 57 | | 9.57 |
| 53 | Anawanda L | 6/28/1998 | | 5.49 | 1.5 | | 0.01 | | | | 2 | 6.54 | 57 | | 2.67 |
| 53 | Anawanda L | 7/12/1998 | 14.0 | 6.00 | 1.0 | | 0.01 | | | | 2 | 7.68 | 55 | | 2.89 |

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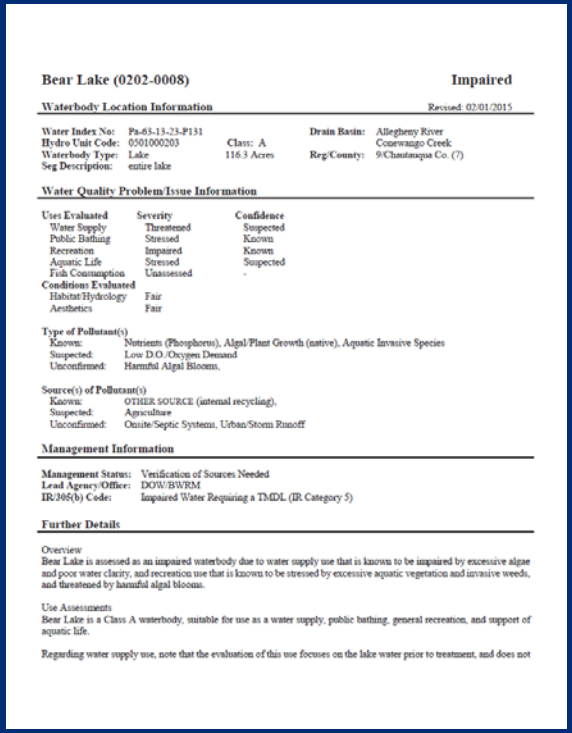
# Appendix A: Raw data

- 'Interpreted' by legend at end of data (full page of info in legend)
  - Name
  - Description
  - Detection limit
  - Pertinent standard

# Appendix B: PWL Writeup

- Existing PDF from DEC web site (http://www.dec.ny.gov/chemical/36730.html)
- Most have not been updated for MANY years
- DEC slowly starting to update PWL segments
- CSLAP info will figure prominently in these updates



**Bear Lake (0202-0008)** **Impaired**

**Waterbody Location Information** Revised: 02/01/2015

**Water Index No:** Pa-63-13-23-P131
**Hydro Unit Code:** 0501000203
**Waterbody Type:** Lake
**Seg Description:** entire lake
Class: A
116.3 Acres
**Drain Basin:** Allegheny River
Conewango Creek
**Reg/County:** 9/Chautauqua Co. (7)

**Water Quality Problem/Issue Information**

| Uses Evaluated | Severity | Confidence |
|---|---|---|
| Water Supply | Threatened | Suspected |
| Public Bathing | Stressed | Known |
| Recreation | Impaired | Known |
| Aquatic Life | Stressed | Suspected |
| Fish Consumption | Unassessed | - |
| **Conditions Evaluated** | | |
| Habitat/Hydrology | Fair | |
| Aesthetics | Fair | |

**Type of Pollutant(s)**
Known: Nutrients (Phosphorus), Algal/Plant Growth (native), Aquatic Invasive Species
Suspected: Low D.O./Oxygen Demand
Unconfirmed: Harmful Algal Blooms,

**Source(s) of Pollutant(s)**
Known: OTHER SOURCE (internal recycling),
Suspected: Agriculture
Unconfirmed: Onsite/Septic Systems, Urban/Storm Runoff

**Management Information**

**Management Status:** Verification of Sources Needed
**Lead Agency/Office:** DOW/BWRM
**IR/305(b) Code:** Impaired Water Requiring a TMDL (IR Category 5)

**Further Details**

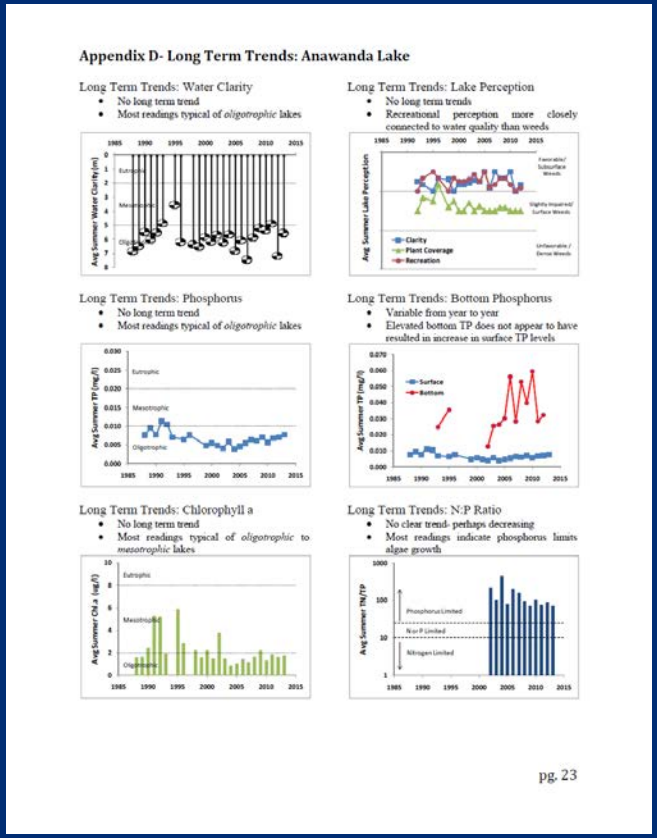
Overview
Bear Lake is assessed as an impaired waterbody due to water supply use that is known to be impaired by excessive algae and poor water clarity, and recreation use that is known to be stressed by excessive aquatic vegetation and invasive weeds, and threatened by harmful algal blooms.

Use Assessments
Bear Lake is a Class A waterbody, suitable for use as a water supply, public bathing, general recreation, and support of aquatic life.

Regarding water supply use, note that the evaluation of this use focuses on the lake water prior to treatment, and does not

# Appendix C: Long Term Trends

- New to 2012 report
- For most numeric indicators
- Two bullet points for each:
  - Trend assessment (drawn from lake condition table)
  - Brief summary of "finding"
  - Not automated, but drawn from past years



**Appendix D- Long Term Trends: Anawanda Lake**

Long Term Trends: Water Clarity
- No long term trend
- Most readings typical of *oligotrophic* lakes

Long Term Trends: Lake Perception
- No long term trends
- Recreational perception more closely connected to water quality than weeds

Long Term Trends: Phosphorus
- No long term trend
- Most readings typical of *oligotrophic* lakes

Long Term Trends: Bottom Phosphorus
- Variable from year to year
- Elevated bottom TP does not appear to have resulted in increase in surface TP levels

Long Term Trends: Chlorophyll a
- No long term trend
- Most readings typical of *oligotrophic* to *mesotrophic* lakes

Long Term Trends: N:P Ratio
- No clear trend- perhaps decreasing
- Most readings indicate phosphorus limits algae growth

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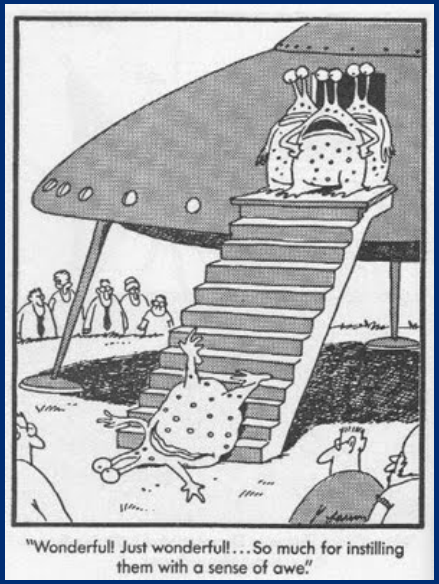
## What we've done right

All done by start of next year

Summarizes all info

Meets needs of several audiences




## What we haven't

Too long

Too short

Too much information

Not enough analysis

Not read by enough people

'Yeah……but…?"

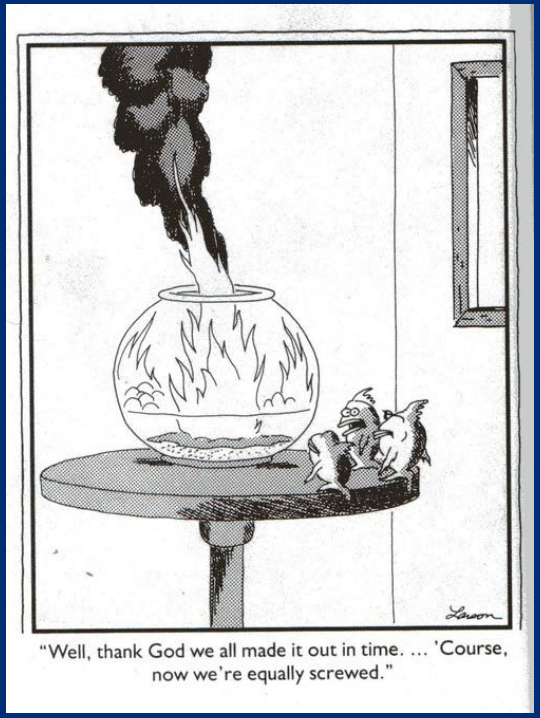
Explained enough of the "how"

Still comes too late

Nothing in real time

More big picture focus needed

# …and now?




# Trying to do better

To address "too long" and "yeah…..but?":

Question and Answer

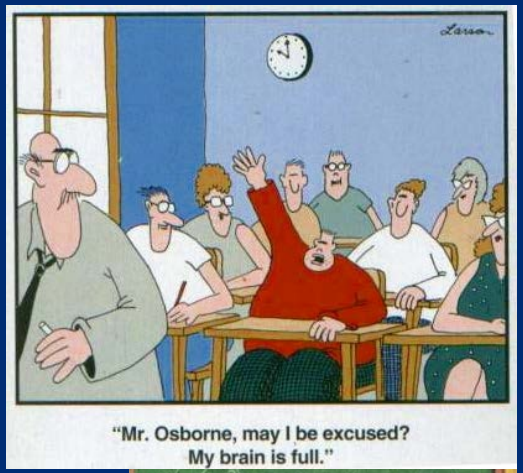
What about "too much" and the "how"?

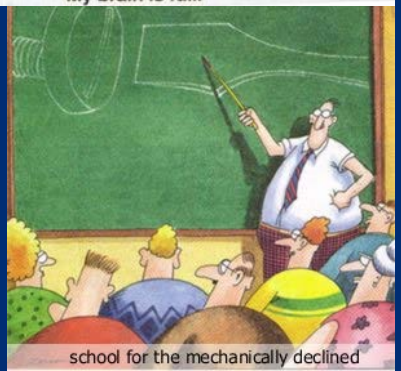
Expanded scorecard

And "too late" and no "real time"?

In season reporting

# Questions and Answers




One page executive summary

Developed by CSLAP committee

Each Q&A answered by DEC

Few sentence answers to big concerns

- Overall condition?
- Anything new?
- Comparison to nearby lakes?
- Any trends?
- Should we be concerned? Tipping point?
- What should we do?

Also contains lake use scorecard

# Scorecards

Graphic overview of lake conditions

Four scorecards with color codes

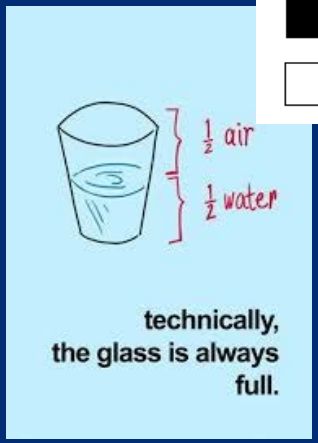
- Water Quality
- Biological Health
- Lake Perception
- Lake Use

Average year and current year

Trends where appropriate

Criteria and explanation built off algorithms developed by DEC

Criteria included in 2014 report

# Lake Use Scorecard

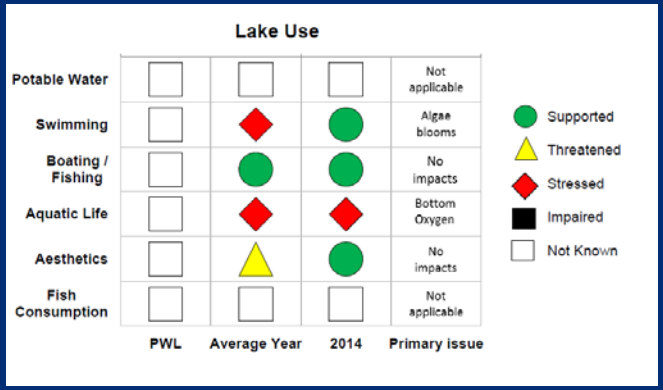
Included on Q&A page

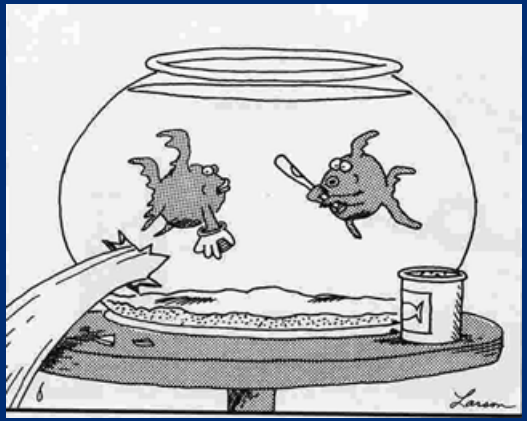
Lake Use Scorecard compares conditions to designated uses

- Designated uses for all lakes- swimming/boating (recreation), aquatic life, fish consumption
- Drinking water for some lakes
- Average conditions and current year
- Cites primary reason for rating

Also compares to PWL if available

- Priority Waterbody List – a talk later today!



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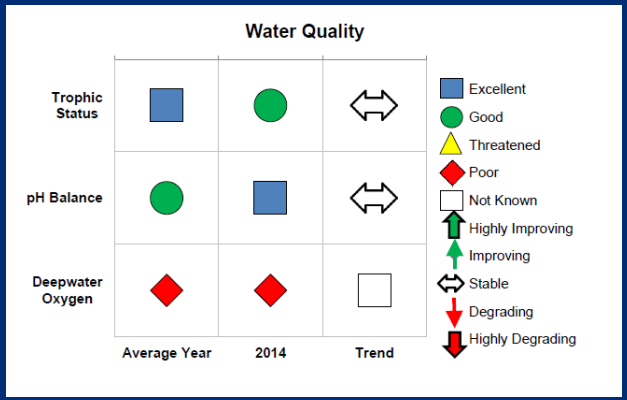
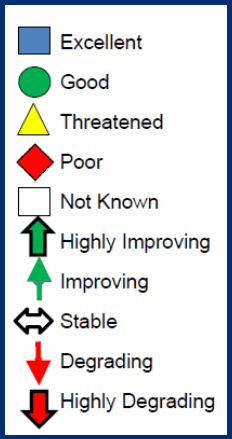



# Water Quality Scorecard




Average year, current year, & trend shown

Trophic status – overall lake health

- Phosphorus:  nutrients
- Chlorophyll a: algae in water
- Clarity: how far you can see the Secchi disk

pH balance

- suitability for plants and animals (good range)

Deepwater dissolved oxygen levels

- Oxygen availability for fish and animals
- Significant chemical changes if oxygen is absent

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# Biological Health Scorecard

Invasive plants and animals

- Unfavorable = invasive in lake
- Threatened = invasive close by

Harmful algae blooms

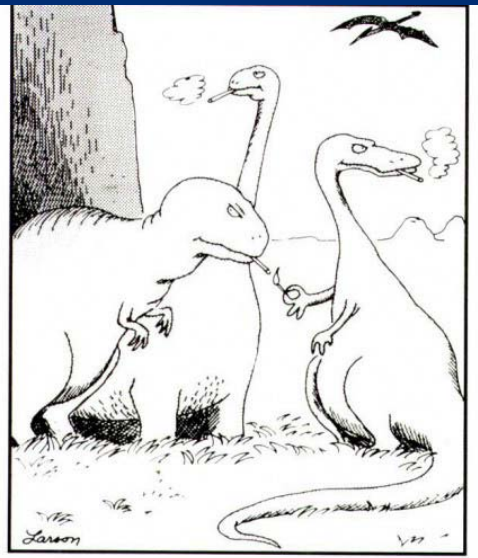
- Unfavorable = sample unsafe for recreation

Fisheries

Plant diversity

Benthic (bottom dwelling) animals

Limited data evaluated against high quality lakes for last 3 categories




The real reason dinosaurs became extinct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# Lake Perception Scorecard

Visual observation by CSLAP volunteers

Same questions asked each year

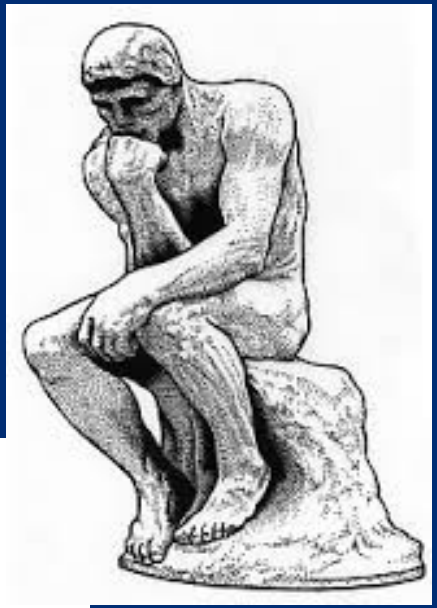
- Average response from this season
- Average year, current year, trend

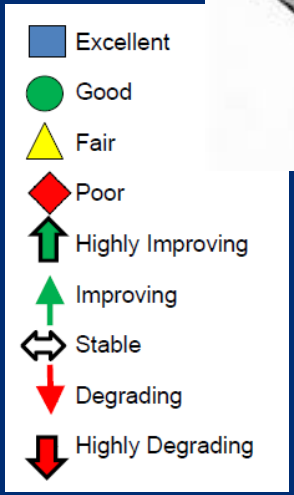
Water clarity

Abundance of water plants

Suitability for recreational use

Used to help set standards





# Questions? Ask Your Lake Doctor!