

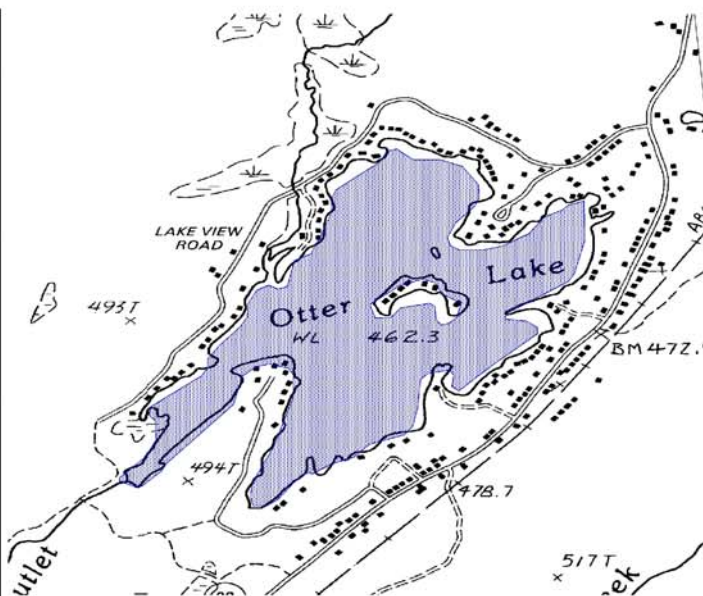
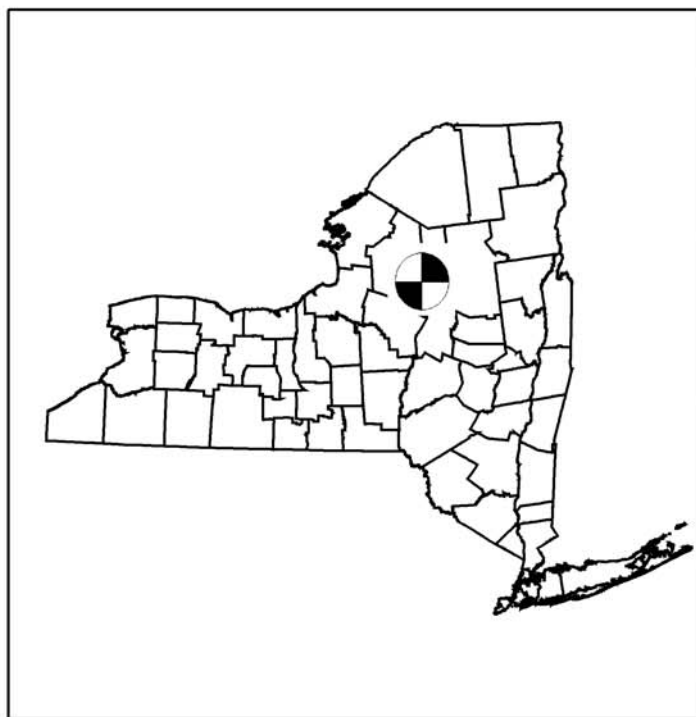


Division of Water

New York
Citizens Statewide Lake Assessment Program
(CSLAP)

2007 Annual Report- Otter Lake

October, 2008



2007 INTERPRETIVE SUMMARY
ANNUAL REPORT

NEW YORK
CITIZENS STATEWIDE
LAKE ASSESSMENT PROGRAM
(CSLAP)

OTTER LAKE

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NYS Department of Environmental Conservation
NY Federation of Lake Associations

October, 2008

BACKGROUND AND ACKNOWLEDGMENT

The Citizens Statewide Lake Assessment Program (CSLAP) is a volunteer lake monitoring program conducted by the NYS Department of Environmental Conservation (NYSDEC) and the NYS Federation of Lake Associations (FOLA). Founded in 1986 with 25 pilot lakes, the program has involved more than 200 lakes, ponds, and reservoirs and 1000 volunteers from eastern Long Island to the northern Adirondacks to the western-most lake in New York, and from 10-acre ponds to several Finger Lakes, Lake Ontario, Lake George, and lakes within state parks. In this program, lay volunteers trained by the NYSDEC and FOLA collect water samples, observations, and perception data every other week in a 15 week interval between May and October. Water samples are analyzed by certified laboratories. Analytical results are interpreted by the NYSDEC and FOLA and utilized for a variety of purposes by the State of New York, local governments, researchers, and, most importantly, participating lake associations. This report summarizes the 2007 sampling results for **Otter Lake**.

Otter Lake is a 134 acre, class A lake found in the Town of Forestport in Oneida County, in the southwestern Adirondack region of New York State. It was first sampled as part of CSLAP in 1992. The following volunteers have participated in CSLAP, and deserve most of the credit for the success of this program at **Otter Lake**: **Laura, Brenda, Marcus, and Mark Kozien, Jim LeClaire, Gene Klara, C. Robitelle, Jim Carroll, H. Lockwood, and Scott Thomas Lincoln.**

In addition, the authors wish to acknowledge the following individuals, without whom this project and report would never have been completed:

From the Department of Environmental Conservation, Dick Draper, and Margaret Novak for supporting CSLAP in the last several years; Jay Bloomfield and James Sutherland, for their work in developing and implementing the program, and the technical staff from the Lake Services Section and the Statewide Water Monitoring Section, for continued technical review of program design.

From the Federation of Lake Associations, Anne Saltman, Dr. John Colgan, Don Keppel, Nancy Mueller and the Board of Directors, for their continued strong support of CSLAP.

The New York State Department of Health (prior to 2002) and Upstate Freshwater Institute (since 2002), particularly Steve Effler, MaryGail Perkins, and Elizabeth Miller provided laboratory materials and all analytical services, reviewed the raw data, and implemented the quality assurance/quality control program.

Finally, but most importantly, the authors would like to thank the more than 1,500 volunteers who have made CSLAP a model for lay monitoring programs throughout the country and the recipient of a national environmental achievement award. Their time and effort have served to greatly expand the efforts of the state and the public to protect and enhance the magnificent water resources of New York State.

ABRIDGED SUMMARY- OTTER LAKE 2007

1. Were there any significant differences in the lake eutrophication indicators (water clarity, phosphorus, chlorophyll *a*) in 2007 compared to the typical CSLAP sampling season?

Response: Otter Lake was probably more productive in 2007 than in the typical CSLAP sampling season. Phosphorus levels were substantially higher than in the typical CSLAP sampling season, coincident with slightly lower water clarity and higher water color. Algae levels (as measured by chlorophyll *a*) were slightly lower than normal in 2007, perhaps due to light inhibition from the “brownness” of the water, as reported by the sampling volunteers.

2. Were there any significant differences in the other lake water quality indicators (pH, conductivity, color, nitrogen, calcium) in 2007 compared to the typical CSLAP sampling season?

Response: Conductivity, nitrate, and especially color readings were higher than normal in 2007, perhaps part of a longer-term trend. Otter Lake continues to exhibit characteristics typical of moderately to highly colored lakes with moderately softwater lakes, low nitrate to moderately low ammonia levels, and circumneutral to weakly alkaline (near to slightly above neutral pH) conditions. The lake does not appear to be susceptible to zebra mussel infestations, based on the low calcium levels in the lake.

3. Were there any significant differences in the lake perception indicators (water quality, aquatic plants, recreation) in 2007 compared to the typical CSLAP sampling season?

Response: Recreational use assessments have been somewhat unfavorable during nearly CSLAP sampling seasons, including 2007, with both poor water clarity and excessive weed growth impacting recreational uses of the lake. The latter was less frequently cited as impacting recreational uses, probably due to the grass carp stocking, although the higher water color and lower water transparency may have balanced this, since “poor water clarity” and “excessive algae” were more frequently implicated in recreational use impacts. Water quality assessments were slightly less favorable in 2007, due to the higher color and lower clarity, while surface aquatic plant coverage was limited to early summer, before the onset of more intensive grass carp herbivory.

4. Are there any long term trends in any of the water quality or lake perception indicators, and can these trends be tied to weather patterns or lake management activities?

Response Total phosphorus and water color readings were higher than normal in 2007, continuing a longer-term trend started around 2002. It is not yet known if these long-term patterns are statistically significant or reflect in the influence of wetter weather and heavy runoff. Water clarity readings have decreased over the same period, despite the lack of a long-term trend in chlorophyll *a* readings. The rise in color may be coincident with a recent but small increase in nitrate levels and more variable increase in conductivity. None of the other non-trophic indicators have exhibited any long-term trends. Recreational use assessments are closely tied to both water quality assessments and aquatic plant coverage. The former may be varying with weather conditions, with higher water color and lower clarity in recent years coincident with generally wetter weather.

ABRIDGED SUMMARY- OTTER LAKE 2007 (cont)

5. Did any of the data or information collected through CSLAP in 2007 indicate any differences from the PWL (Priority Waterbody List) evaluation for the lake provided in the 2006 CSLAP report (available at www.nysfola.org)?

Response: The 1999 NYSDEC Priority Waterbody Listings (PWL) for the Black River drainage basin indicate that *bathing* and *boating* are *stressed* in Otter Lake by excessive weeds. The CSLAP datasets suggest that *bathing* may also be *stressed* by poor water clarity, perhaps moreso after the introduction of grass carp (which either contributed to the poor clarity, or, more likely, shifted the focus of concern to poor water clarity and high water color).

6. Were any aquatic plant collections conducted in 2007, and if so, what plants were identified?

Response: Aquatic plant surveys have not been conducted through CSLAP at Otter Lake since 1998.

7. Is there any other information the Otter Lake community should be made aware of, based on the 2007 CSLAP data?

Response: It is not known if the grass carp stocking (and removal of aquatic plants) contributed to the higher nutrient levels in the lake, although the continued presence of weeds and the “brownness” of the water suggests that the rise in phosphorus is unrelated to migration of nutrients from plants to water. The rise in color, conductivity and (recently) nitrate may indicate greater runoff into the lake, and nearshore and watershed sources of nutrients, sediment and other erodible materials should be evaluated.

NEW YORK STATE, CSLAP AND OTTER LAKE WATER-QUALITY DATA: 1986-2006

Overall Summary:

Although water-quality conditions at each CSLAP lake have varied each year since 1986, and although detailed statistical analyses of the entire CSLAP dataset has not yet been conducted, general water-quality trends can be evaluated after 5-21 years' worth of CSLAP data from these lakes. Overall (regional and statewide) water-quality conditions and trends can be evaluated by a variety of different means. Each of the tested parameters ("analytes") can be evaluated by looking at how the analyte varies from year to year from the long-term average ("normal") condition for each lake, and by comparing these parameters across a variety of categories, such as across regions of the state, across seasons (or months within a few seasons), and across designated best uses for these lakes. Such evaluations are provided in the second part of this summary, via figures 7 through 17. The annual variability is expressed as the difference in the annual average (mean) from both the long-term average and the normal variability expected from this long-term average. The latter can be presented as the "standard error" (SE, calculated here within the 95% confidence interval)—one standard error away from the long-term average can be considered a "moderate" change from "normal," with a deviation of two or more standard errors considered to be a "significant" change. For each of these parameters, the percentage of lakes with annual data falling within one standard error from the long-term average are considered to exhibit "no change," with the percentage of lakes demonstrating moderate to significant changes also displayed on these graphs (figures 7a through 17a). Annual changes in these lakes can also be evaluated by standard linear regressions- annual means over time, with moderate correlation defined as $R^2 > 0.33$, and significant correlation defined as $R^2 > 0.5$. These methods are described in greater detail in Appendix D. Assessments of weather patterns—whether a given year was wetter or drier than usual—accounts for broad statewide patterns, not weather conditions at any particular CSLAP lake. As such, weather may have very different impacts at some (but not most) CSLAP lakes in some of these years.

Long-term trends can also be evaluated by looking at the summary findings of individual lakes and attempting to extrapolate consistent findings to the rest of the lakes. Given the (non-Gaussian) distribution of many of the water-quality parameters evaluated in this report, non-parametric tools may be the most effective means for assessing the presence of a water-quality trend. However, these tools do not indicate the magnitude of the trend. As such, a combination of parametric and non-parametric tools is employed here to evaluate trends. The Kendall tau ranking coefficient has been utilized by several researchers and state water-quality agencies to evaluate water-quality trends via non-parametric analyses and is utilized here. For parametric analyses, best-fit analysis of summer (June 15 through September 15) averages for each of the eutrophication indicators can be evaluated, with trends attributable to instances in which deviations in annual means exceed the deviations found in the calculation of any single annual mean. "Moderate" change is defined as $\tau > 0.33$, and "significant" change is defined as $\tau > 0.5$. It has been demonstrated in many of these programs that long-term trend analyses cannot be utilized to evaluate lake datasets until at least five years' worth of data have been collected.

As of 2007, there were 157 CSLAP lakes that have been sampled for at least five years; of these, 113 were sampled within the last five years. The change in these lakes is demonstrated in figures 7 and 8; figures 7a through 7l indicate "moderate" long-term change, while figures 8a through 8l indicate "significant" long-term change. When these lakes are analyzed by this combination of parametric and non-parametric analyses, these data suggest that while most NYS lakes have not demonstrated a significant change (either τ or $R^2 > 0.5$) or even a moderate changes (τ or $R^2 > 0.33$).

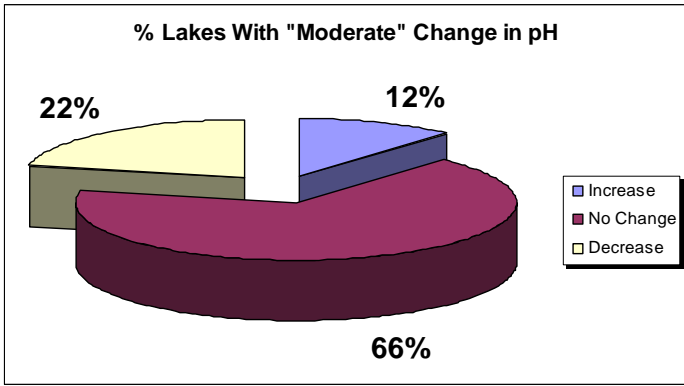


Figure 7a. %CSLAP Lakes Exhibiting Moderate Long-Term Change in pH

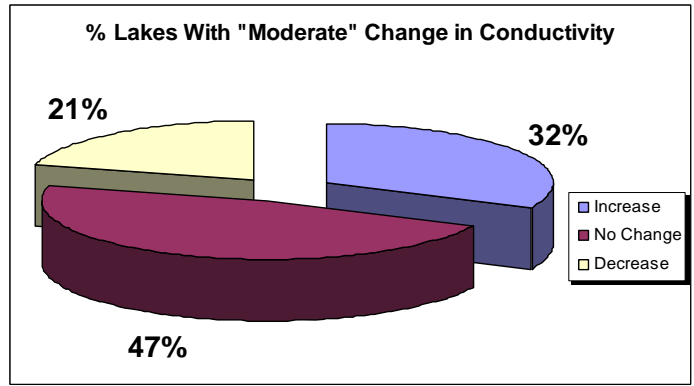


Figure 7b. %CSLAP Lakes Exhibiting Moderate Long-Term Change in Conductivity

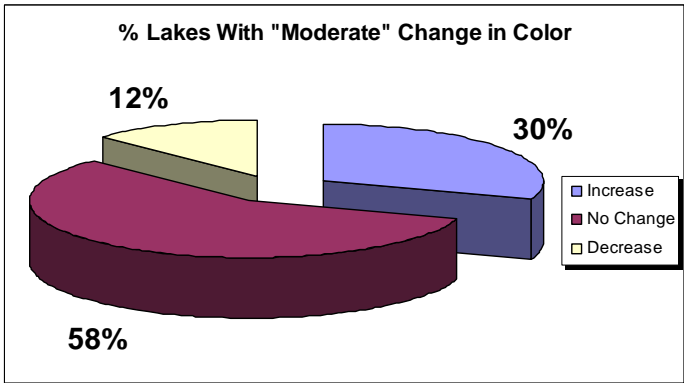


Figure 7c. %CSLAP Lakes Exhibiting Moderate Long-Term Change in Color

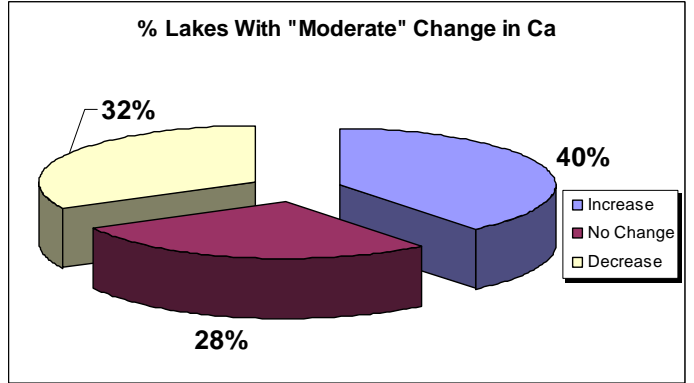


Figure 7d. %CSLAP Lakes Exhibiting Moderate Long-Term Change in Calcium

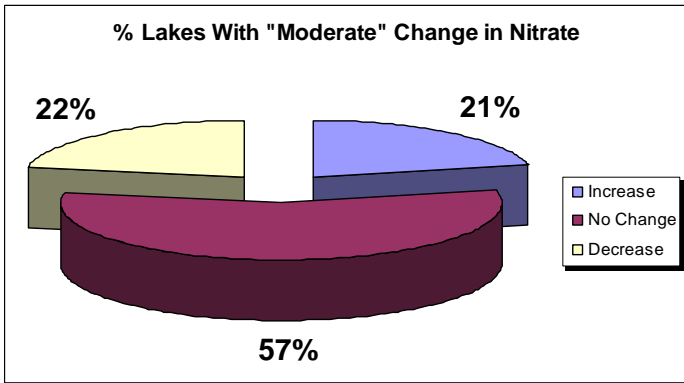


Figure 7e. %CSLAP Lakes Exhibiting Moderate Long-Term Change in Nitrate

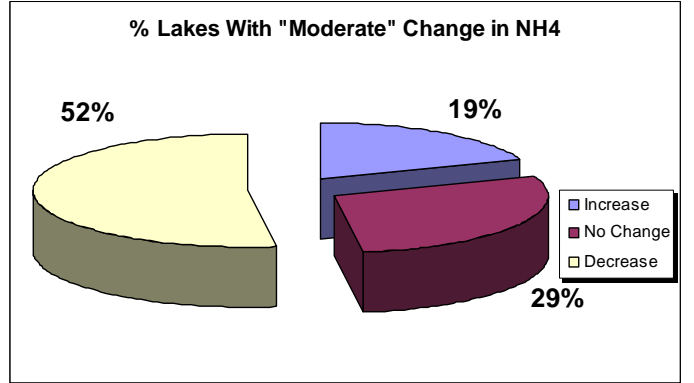


Figure 7f. %CSLAP Lakes Exhibiting Moderate Long-Term Changes in Ammonia

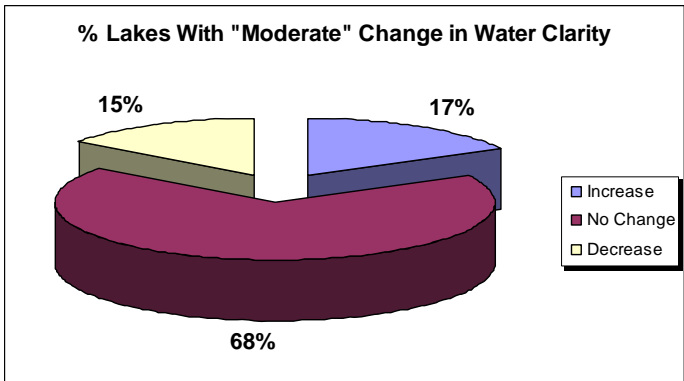


Figure 7g. %CSLAP Lakes Exhibiting Moderate Long-Term Change in Water Clarity

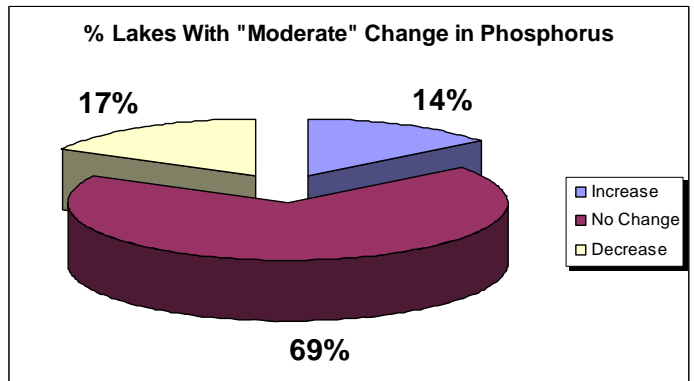


Figure 7h. %CSLAP Lakes Exhibiting Moderate Long-Term Changes in Phosphorus

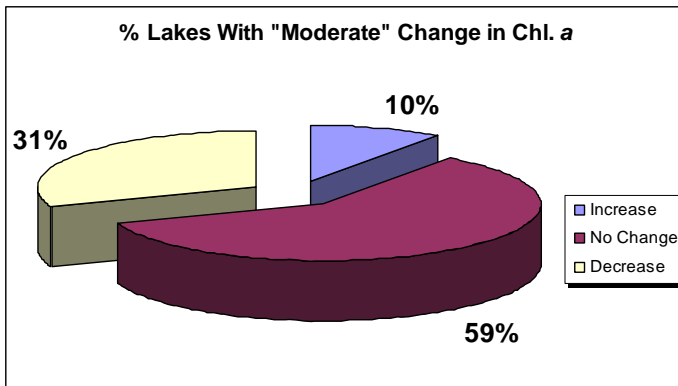


Figure 7i. %CSLAP Lakes Exhibiting Moderate Long-Term Change in Chlorophyll a

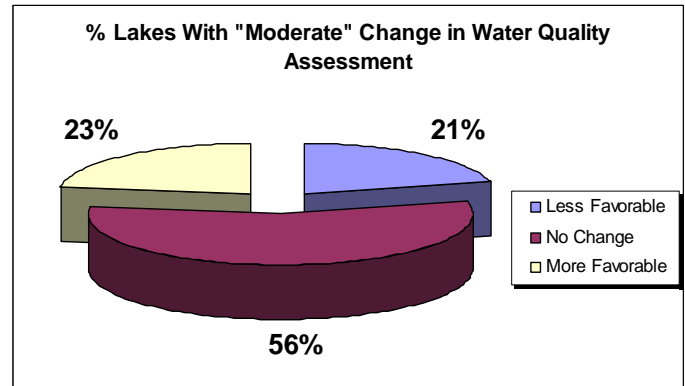


Figure 7j. %CSLAP Lakes Exhibiting Moderate Long-Term Change in Water-quality Assessment

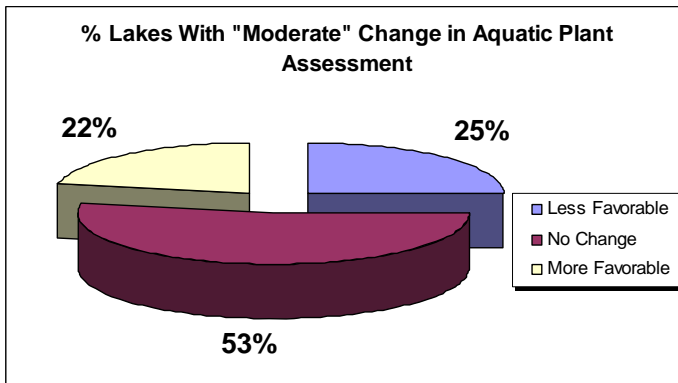


Figure 7k. %CSLAP Lakes Exhibiting Moderate Long-Term Change in Aquatic Plant Assessment

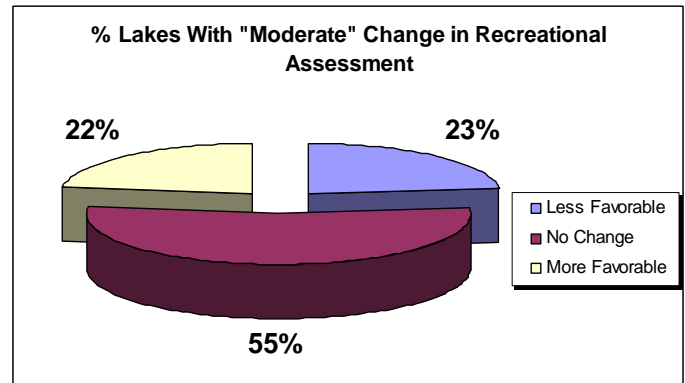


Figure 7l. %CSLAP Lakes Exhibiting Moderate Long-Term Change in Recreational Assessment

Some of the lakes sampling through CSLAP have demonstrated a moderate change since CSLAP sampling began in 1986, at least for some of the sampling parameters measured through CSLAP. In general, between 50% and 65% of the CSLAP lakes have not exhibited even moderate changes. Some of the parameters that have exhibited moderate changes may not reflect actual water-quality change. For example, it appears that the increase in color (Figure 7c) and decrease in nitrate (Figure 7e) and chlorophyll *a* (Figure 7i) is probably due to the shift in laboratories, even though the analytical methods are comparable. The increase in conductivity (Figure 7b) and decrease in pH (Figure 7a) are probably real phenomena—both changes were evident to some degree prior to the shift in laboratories, and both are largely predictable. The difference between the increase and decrease in the other sampling parameter (or between more favorable and less favorable conditions) does not appear to be important and probably indicates random variability.

Figures 8a through 8l indicate that, not surprisingly, “substantial” change is less common. Substantial change follows the same patterns as discussed above with the evaluation of “moderate” change in CSLAP lakes, except that the percentage of CSLAP lakes not exhibiting significant change is much higher, rising to about 65-80% of these lakes. For those CSLAP lakes exhibiting substantial change, it is most apparent in the same parameters described above. About 25% of the CSLAP lakes have exhibited a substantial increase in conductivity, consistent with a broad (and expected) successional pattern, in which lakes generally concentrate materials washed in from the surrounding watershed (and as the runoff itself concentrates materials as these watersheds move from forested to more urbanized, whether via residential development or other uses. The comparison between figures 8b and 8e through 8h indicate that this has not (yet) translated into higher nutrient loading into lakes.

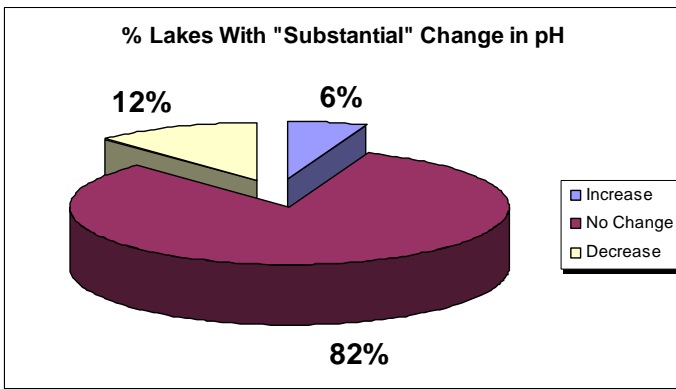


Figure 8a. %CSLAP Lakes Exhibiting Substantial Long-Term Change in pH

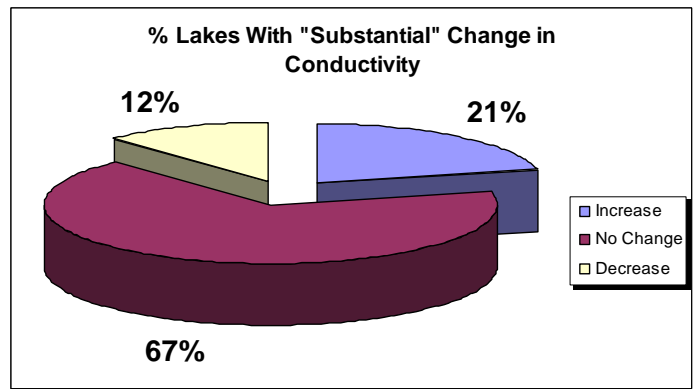


Figure 8b. %CSLAP Lakes Exhibiting Substantial Long-Term Change in Conductivity

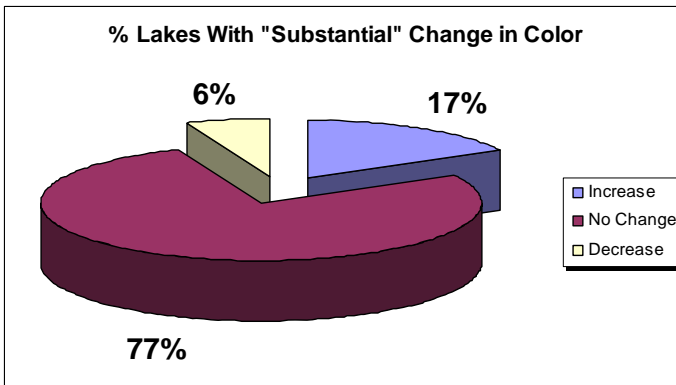


Figure 8c. %CSLAP Lakes Exhibiting Substantial Long-Term Change in Color

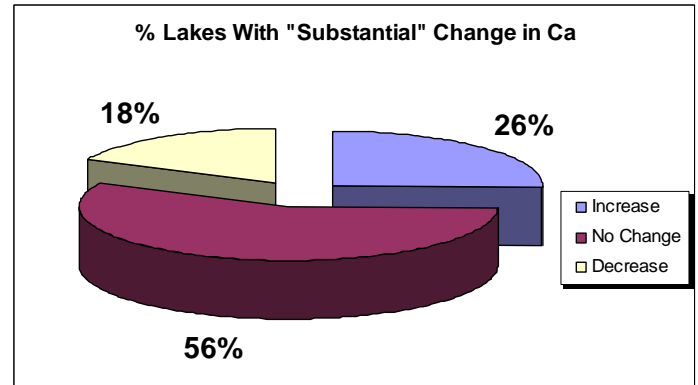


Figure 8d. %CSLAP Lakes Exhibiting Substantial Long-Term Change in Calcium

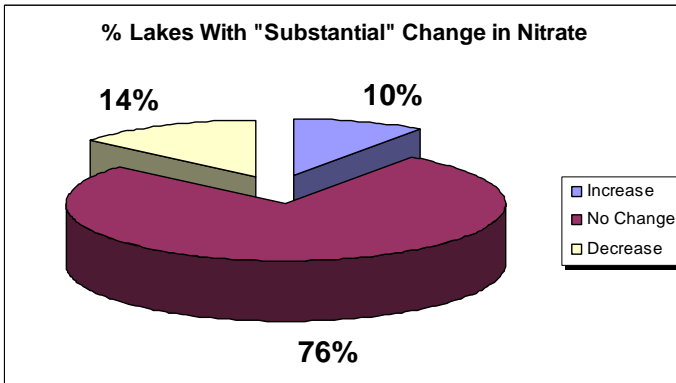


Figure 8e. %CSLAP Lakes Exhibiting Substantial Long-Term Change in Nitrate

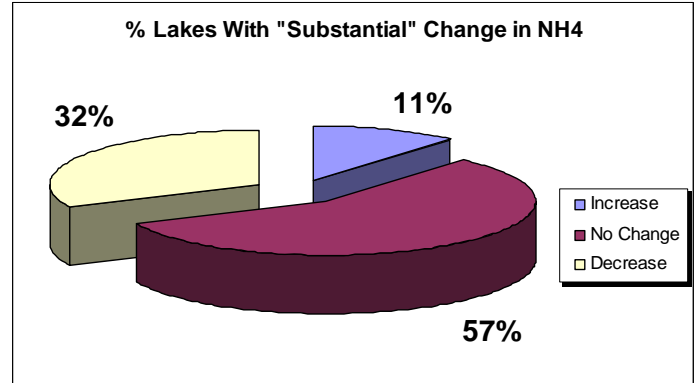


Figure 8f. %CSLAP Lakes Exhibiting Substantial Long-Term Changes in Ammonia

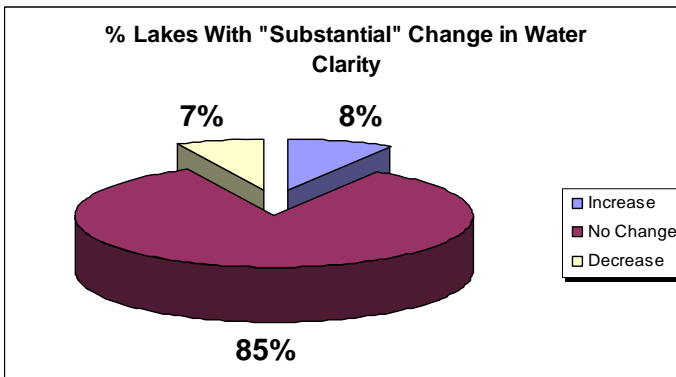


Figure 8g. %CSLAP Lakes Exhibiting Substantial Long-Term Change in Water Clarity

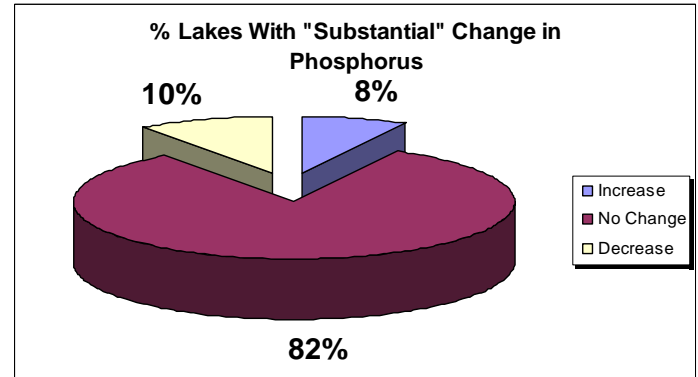


Figure 8h. %CSLAP Lakes Exhibiting Substantial Long-Term Changes in Phosphorus

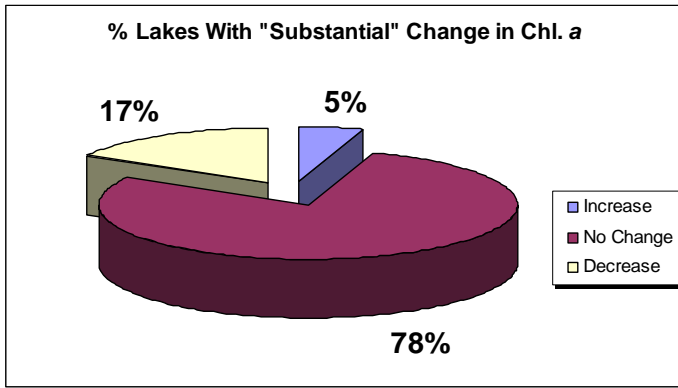


Figure 8i. %CSLAP Lakes Exhibiting Substantial Long-Term Change in Chlorophyll a

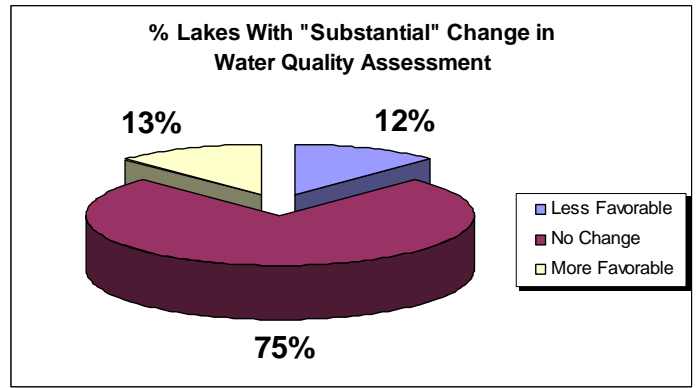


Figure 8j. %CSLAP Lakes Exhibiting Substantial Long-Term Change in Water-quality Assessment

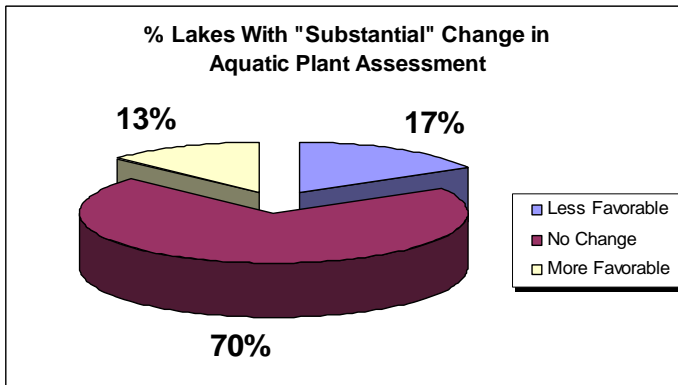


Figure 8k. %CSLAP Lakes Exhibiting Substantial Long-Term Change in Aquatic Plant Assessment

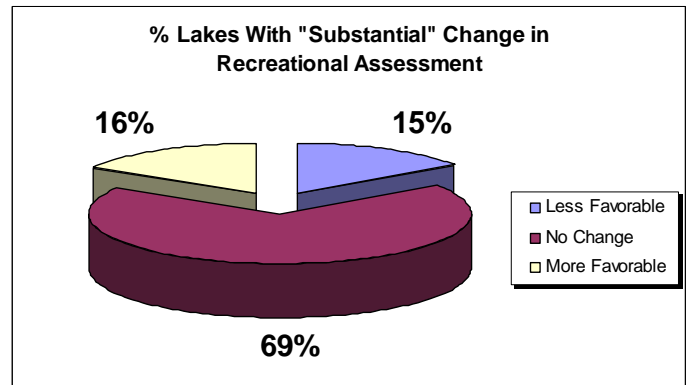


Figure 8l. %CSLAP Lakes Exhibiting Substantial Long-Term Change in Recreational Assessment

As noted above, there does not appear to be any clear pattern between weather and water-quality changes, although some connection between changes in precipitation and changes in some water-quality indicators is at least alluded to in some cases. However, all of these lakes may be the long-term beneficiaries of the ban on phosphorus in detergents in the early 1970s, which, with other local circumstances (perhaps locally more “favorable” weather, local stormwater or septic management, etc.), has resulted in less productive conditions. Without these circumstances, water-quality conditions in many of these lakes might otherwise be more productive in the creeping march toward aging, eutrophication, and succession (as suggested from the steady rise in conductivity). In other words, the higher materials loading into these lakes may be largely balanced by a reduction in nutrients within the corresponding runoff.

The drop in pH in NYS lakes has been studied at length within the Adirondacks and may continue to be attributable on a statewide basis to acid rain, which continues to fall throughout the state. The CSLAP dataset is not adequate to evaluate any ecological changes associated with higher lake acidity, and it is certainly worth noting that the slight drop in pH in most CSLAP lakes does not bring these lakes into an acidic status (these lakes have, at worse, become slightly less basic). In addition, for lakes most susceptible to acidification, laboratory pH is only an approximation of actual pH. Fully accurate pH readings require field measurements using very specialized equipment, although for most lakes with even modest buffering capacity, laboratory pH is a good estimate of *in situ* pH readings. So while the decrease in pH in some CSLAP lakes should continue to be watched, it does not appear to be a cause for concern, at least relative to the low pH in small, undeveloped, high-elevation lakes within the Adirondack Park.

Lake perception has changed more significantly than water-quality (except conductivity). None of the lake perception indicators—water-quality, weeds, or recreation—have varied in a consistent manner, although variability is more common in each of these indicators. The largest change is in recreational assessments, with about one third of all lakes exhibiting substantial change and nearly half demonstrating moderate change. A more detailed analysis of these assessments (not presented here) indicates that the Adirondacks have demonstrated more “positive” change than other regions of the state, due to the perception that aquatic weed densities have not increased as significantly (and water-quality conditions have improved in some cases). However, the rapid spread of *Myriophyllum spicatum* into the interior Adirondacks will likely reverse this “trend” in coming years, and it is not clear if these “findings” can be extrapolated to other lakes within the Adirondack Park.

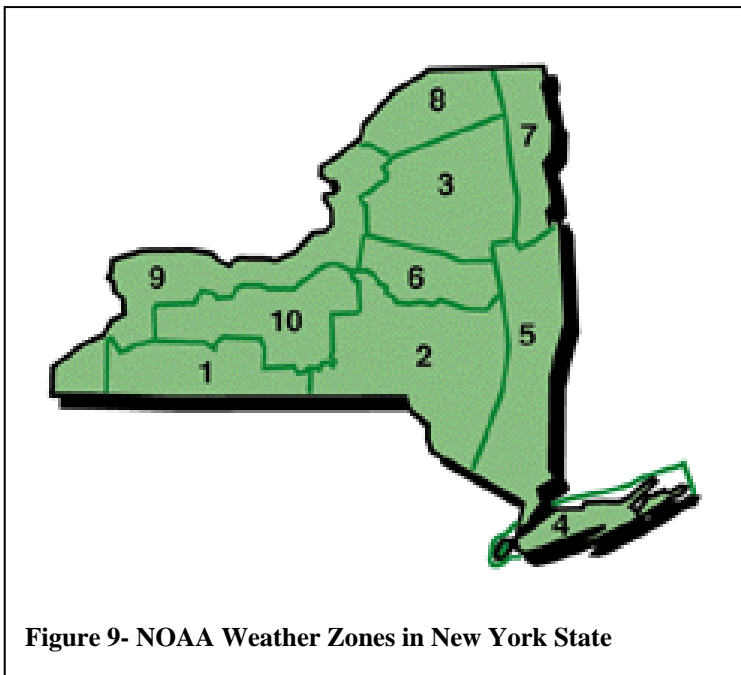


Figure 9- NOAA Weather Zones in New York State

Larger trends and observations about each of the CSLAP sampling parameters are presented below in figures 10 through 21. Information about general precipitation and runoff patterns—whether a particular year was wet or dry—is reported to provide a basis for understanding the connection between weather and water quality for lakes in New York state. It is clear that weather patterns are highly variable within the state. While this is also apparent down at the individual lake scale—storms can fall at a lake but not a neighboring lake—the National Oceanographic and Atmospheric Administration (NOAA) has established ten weather zones in New York state corresponding to regions exhibiting similar weather patterns. Weather data for the state can be summarized by each of these zones, in

an attempt to fine-tune individual lake analyses to local weather data.

The individual parameter summaries provided in figures 10-20 correspond to the predominant weather patterns found from 1986 to 2006 in the state. A code can be located above the columns for each year; a “↑” corresponds to wetter (>50%) than normal weather, while “↓” corresponds to drier (<50%) than normal weather, and “0” corresponds to normal weather. In this code, the first symbol corresponds to the winter and spring precipitation, and the second symbol corresponds to summer precipitation. So, for example, a code of “↑↓” corresponds to a wet spring and dry summer, while “00” corresponds to normal spring and summer precipitation. While ideally the individual parameter summaries and weather summaries could be delineated by weather zone, the CSLAP lake dataset is not sufficient large for most of these weather zones to generate statistically meaningful data summaries. However, these weather zone data are used in the individual lake data summaries in **Section IV: Detailed Otter Lake Water Quality Summary.**

Otter Lake is in NOAA weather zone 3, the Northern Plateau. The precipitation patterns for this zone are summarized below.

Statewide and Otter Lake Regional Weather Patterns

Weather patterns in New York state have varied significantly from year to year since at least 1986. This may be a response to global climatic change, since greater weather variance has been observed by both climatologists and casual observers.

Using the criteria above (wetter = >50% more precipitation than the long-term average, drier = >50% less precipitation than normal) and equally weighing each of the 10 NOAA weather zones in New York state, Table 1 shows the winter (January through March) and spring (April through June) precipitation and “summer” (June through September) precipitation patterns for New York state and the NOAA zone corresponding to Fulton Second Lake. Summer was defined here to overlap with spring to include the entirety of the sampling season for most CSLAP lakes.

Year	Statewide Avg: Winter-Spring / Summer	NOAA Zone 3 Avg: Winter-Spring / Summer
1986	Normal / Wet	Normal / Wet
1987	Dry / Normal	Dry / Normal
1988	Very Dry / Normal	Very Dry / Normal
1989	Wet / Normal	Normal / Very Wet
1990	Very Wet / Normal	Very Wet / Dry
1991	Normal / Normal	Normal / Normal
1992	Normal / Wet	Normal / Normal
1993	Wet / Normal	Wet / Dry
1994	Wet / Normal	Wet / Normal
1995	Very Dry / Normal	Very Dry / Normal
1996	Very Wet / Normal	Wet / Normal
1997	Normal / Normal	Wet / Normal
1998	Very Wet / Normal	Very Wet / Normal
1999	Normal / Normal	Normal / Normal
2000	Very Wet / Normal	Very Wet / Normal
2001	Normal / Normal	Normal / Normal
2002	Very Wet / Dry	Wet / Dry
2003	Normal / Wet	Normal / Normal
2004	Dry / Very Wet	Normal / Normal
2005	Normal / Normal	Dry / Wet
2006	Wet / Wet	Wet / Normal

Table 1: Statewide and NOAA Zone 3 Weather Patterns

dry.

The weather data in Table 1 shows that wetter than normal summers have occurred in three of the last four years, although more variable weather patterns have occurred in the winter and spring. The wettest years have been 1990, 1996, 1998, 2004 and 2006, while the driest years were 1988 and 1995. The only dry seasons since 1995 were the winter of 2004 and the summer of 2002.

Data from the Northern Plateau—which includes Otter Lake—have indicated normal to wet conditions over most of the last eleven years. The wettest years have been 1989, 2000, 1998, and 1986, while the driest years were 1995 and 1988. It should be noted that no dry summers or winters have occurred in this region in the last eleven years. In the years in which Otter Lake was sampled through CSLAP, 1994, 1996, and 2006 were wet, and 1995 was

DETAILED OTTER LAKE WATER-QUALITY SUMMARY

CSLAP is intended to provide a database to help lake associations understand lake conditions and foster sound lake protection and pollution prevention decisions. This individual lake summary for 2007 contains two forms of information. The raw data and graphs present a snapshot or glimpse of water-quality conditions at each lake. They are based on (at most) eight or nine sampling events during the summer. As lakes are sampled through CSLAP for a number of years, the database for each lake will expand, and assessments of lake conditions and water-quality data become more accurate. For this reason, lakes new to CSLAP for only one year will not have information about annual trends.

Raw Data

Two “data sets” are provided below. The data presented in Table 2 include an annual summary of the minimum, maximum, and average for each of the CSLAP sampling parameters, including data from other sources for which sufficient quality-assurance/quality-control documentation is available for assessing the validity of the results. This data may be useful for comparing a particular data point for the current sampling year with historical data or information. Tables 3 through 5 includes more detailed summaries of the 2007 and historical data sets, including some evaluation of water-quality trends, comparison against existing water-quality standards, and whether 2007 represented a typical year.

Graphs

The second form of data analysis for your lake is presented in the form of graphs. These graphs are based on the raw data sets to represent a snapshot of water-quality conditions at your lake. The more sampling that has been done on a particular lake, the more information that can be presented on the graph, and the more information you have to identify annual trends for your lake. For example, a lake that has been doing CSLAP monitoring consistently for five years will have a graph depicting five years’ worth of data, whereas a lake that has been doing CSLAP sampling for only one year will only have one. Therefore, it is important to consider the number of sampling years of information in addition to where the data points fall on a graph when trying to draw conclusions about annual trends. There are certain factors not accounted for in this report that lake managers should consider:

- **Local weather conditions** (high or low temperatures, rainfall, droughts or hurricanes). Due to delays in receiving meteorological data from NOAA stations within NYS, weather data from individual weather stations or the present sampling season are not included in these reports. Some of the variability reported below can be attributed more to weather patterns than to a “real” water trend or change. However, it is presumed that much of the sampling “noise” associated with weather is dampened over multiple years of data collection and thus should not significantly influence the limited trend analyses provided for CSLAP lakes with longer and larger databases.
- **Sampling season and parameter limitations.** Because sampling is generally confined to June-September, this report does not look at CSLAP parameters during the winter and other seasons. Winter conditions can impact the usability and water-quality of a lake. In addition, there are other sampling parameters (fecal coliform, dissolved oxygen, etc.) that may be responsible for chemical and biological processes and changes in physical measurements (such as water clarity) and the perceived conditions in the lake. *The 2007 CSLAP report attempts to standardize some comparisons by limiting the evaluation to the summer recreational season and the most common sampling periods (mid-June through mid-September), in the event that samples are collected at other times of the year (such as May or October) during only some sampling seasons.*

TABLE 2: CSLAP Data Summary for Otter Lake

Year	Min	Avg	Max	N	Parameter
1992-07	1.40	2.17	3.30	84	CSLAP Zsd
2007	1.75	1.91	2.25	8	CSLAP Zsd
2006	1.70	1.88	2.05	8	CSLAP Zsd
2005	1.80	1.91	2.05	8	CSLAP Zsd
2004	1.90	2.04	2.20	7	CSLAP Zsd
2003	1.85	1.93	2.00	8	CSLAP Zsd
2002	1.90	2.06	2.25	7	CSLAP Zsd
1996	1.50	2.42	3.00	6	CSLAP Zsd
1995	2.10	2.74	3.30	8	CSLAP Zsd
1994	1.40	2.03	2.65	8	CSLAP Zsd
1993	2.28	2.70	3.20	8	CSLAP Zsd
1992	1.83	2.26	2.60	8	CSLAP Zsd
1986	2.20	2.26	2.40	4	LCI
1985	1.80	1.90	2.00	2	ALSC
1984	1.90	1.90	1.90	1	ELS
Year	Min	Avg	Max	N	Parameter
1992-07	0.004	0.012	0.031	82	CSLAP Tot.P
2007	0.017	0.022	0.031	8	CSLAP Tot.P
2006	0.010	0.014	0.019	8	CSLAP Tot.P
2005	0.008	0.012	0.016	8	CSLAP Tot.P
2004	0.008	0.010	0.015	6	CSLAP Tot.P
2003	0.005	0.009	0.013	8	CSLAP Tot.P
2002	0.006	0.009	0.012	5	CSLAP Tot.P
1996	0.008	0.010	0.015	7	CSLAP Tot.P
1995	0.004	0.008	0.014	8	CSLAP Tot.P
1994	0.008	0.011	0.015	8	CSLAP Tot.P
1993	0.008	0.011	0.014	8	CSLAP Tot.P
1992	0.008	0.011	0.012	8	CSLAP Tot.P
1986	0.004	0.008	0.013	4	LCI
1985	0.010	0.012	0.013	2	ALSC
1984	0.002	0.002	0.002	1	ELS
Year	Min	Avg	Max	N	Parameter
1992-07	0.00	0.02	0.44	76	CSLAP NO3
2007	0.01	0.02	0.04	7	CSLAP NO3
2006	0.01	0.03	0.04	7	CSLAP NO3
2005	0.01	0.03	0.08	8	CSLAP NO3
2004	0.01	0.07	0.44	7	CSLAP NO3
2003	0.00	0.01	0.03	8	CSLAP NO3
2002	0.00	0.02	0.06	7	CSLAP NO3
1996	0.01	0.01	0.02	7	CSLAP NO3
1995	0.01	0.01	0.01	8	CSLAP NO3
1994	0.01	0.01	0.01	5	CSLAP NO3
1993	0.01	0.01	0.01	4	CSLAP NO3
1992	0.01	0.02	0.06	8	CSLAP NO3
1986	0.01	0.06	0.10	3	LCI
1985	0.01	0.04	0.07	2	ALSC
1984	0.24	0.24	0.24	1	ELS

DATA SOURCE KEY

CSLAP	New York Citizens Statewide Lake Assessment Program
LCI	the NYSDEC Lake Classification and Inventory Survey conducted during the 1980s and again beginning in 1996 on select sets of lakes, typically 1 to 4x per year
DEC	other water-quality data collected by the NYSDEC Divisions of Water and Fish and Wildlife, typically 1 to 2x in any give year
ALSC	the NYSDEC (and other partners) Adirondack Lake Survey Corporation study of more than 1500 Adirondack and Catskill lakes during the mid 1980s, typically 1 to 2x
ELS	USEPA's Eastern Lakes Survey, conducted in the fall of 1982, 1x
NES	USEPA's National Eutrophication Survey, conducted in 1972, 2 to 10x
EMAP	USEPA and US Dept. of Interior's Environmental Monitoring and Assessment Program conducted from 1990 to present, 1 to 2x in four year cycles
Additional data source codes are provided in the individual lake reports	

CSLAP DATA KEY:

The following key defines column headings and parameter results for each sampling season:

Min	Minimum reading for the parameter
Avg	Geometric average (mean) reading for the parameter
Max	Maximum reading for the parameter
N	Number of samples collected
Zsd	Secchi disk transparency, meters
Tot.P	Total Phosphorus as P, in mg/l (Hypo = bottom sample)
NO3	Nitrate + Nitrite nitrogen as N, in mg/l
NH4	Ammonia as N, in mg/l
TDN	Total Dissolved Nitrogen as N, in mg/l
TN	Total Nitrogen as N, in mg/l
TP/TN	Phosphorus/Nitrogen ratios, unitless (calculated from TDN)
Ca	Calcium, in mg/l
Tcolor	True color, as platinum color units
pH	(negative logarithm of hydrogen ion concentration), standard pH
Cond25	Specific conductance corrected to 25°C, in µmho/cm
Chl.a	Chlorophyll a, in µg/l
QA	Survey question re: physical condition of lake: (1) crystal clear; (2) not quite crystal clear; (3) definite algae greenness; (4) high algae levels; and (5) severely high algae levels
QB	Survey question re: aquatic plant populations of lake: (1) none visible; (2) visible underwater; (3) visible at lake surface; (4) dense growth at lake surface; (5) dense growth completely covering the nearshore lake surface
QC	Survey question re: recreational suitability of lake: (1) couldn't be nicer; (2) very minor aesthetic problems but excellent for overall use; (3) slightly impaired; (4) substantially impaired, although lake can be used; (5) recreation impossible
QD	Survey question re: factors affecting answer QC: (1) poor water clarity; (2) excessive weeds; (3) too much algae/odor; (4) lake looks bad; (5) poor weather; (6) litter, surface debris, beached/floating material; (7) too many lake users (boats, PWCs, etc); (8) other

TABLE 2: CSLAP Data Summary for Otter Lake (cont)

Year	Min	Avg	Max	N	Parameter
2002-07	0.01	0.04	0.14	45	CSLAP NH4
2007	0.01	0.04	0.11	8	CSLAP NH4
2006	0.02	0.08	0.14	7	CSLAP NH4
2005	0.01	0.01	0.03	8	CSLAP NH4
2004	0.01	0.02	0.07	7	CSLAP NH4
2003	0.01	0.02	0.05	8	CSLAP NH4
2002	0.01	0.05	0.10	7	CSLAP NH4
Year	Min	Avg	Max	N	Parameter
2002-07	0.10	0.51	0.99	44	CSLAP TDN
2007	0.46	0.67	0.78	7	CSLAP TDN
2006	0.47	0.67	0.85	8	CSLAP TDN
2005	0.10	0.24	0.47	8	CSLAP TDN
2004	0.20	0.52	0.99	6	CSLAP TDN
2003	0.31	0.40	0.54	8	CSLAP TDN
2002	0.49	0.56	0.63	7	CSLAP TDN
Year	Min	Avg	Max	N	Parameter
2002-07	18.58	93.70	255.79	41	CSLAP TN/TP
2007	58.45	70.37	82.81	7	CSLAP TN/TP
2006	79.22	106.80	134.76	8	CSLAP TN/TP
2005	18.58	49.17	120.25	8	CSLAP TN/TP
2004	48.27	114.45	255.79	5	CSLAP TN/TP
2003	63.02	100.43	174.01	8	CSLAP TN/TP
2002	91.20	145.15	225.21	5	CSLAP TN/TP
Year	Min	Avg	Max	N	Parameter
1992-07	1	46	145	82	CSLAP TColor
2007	1	76	145	8	CSLAP TColor
2006	54	74	109	7	CSLAP TColor
2005	36	50	80	8	CSLAP TColor
2004	47	54	75	7	CSLAP TColor
2003	38	43	51	8	CSLAP TColor
2002	23	35	43	5	CSLAP TColor
1996	30	47	60	7	CSLAP TColor
1995	25	29	35	8	CSLAP TColor
1994	27	47	55	8	CSLAP TColor
1993	18	25	31	8	CSLAP TColor
1992	25	30	35	8	CSLAP TColor
1986	17	33	50	4	LCI
1985	40	43	45	2	ALSC
1984	53	53	53	1	ELS
Year	Min	Avg	Max	N	Parameter
1992-07	3.74	7.22	8.58	80	CSLAP pH
2007	7.37	7.68	8.33	8	CSLAP pH
2006	6.61	7.08	7.60	7	CSLAP pH
2005	3.74	6.90	8.58	8	CSLAP pH

TABLE 2: CSLAP Data Summary for Otter Lake (cont)

Year	Min	Avg	Max	N	Parameter
1992-07	3.74	7.22	8.58	80	CSLAP pH
2004	6.19	6.97	7.46	7	CSLAP pH
2003	6.87	7.02	7.23	8	CSLAP pH
2002	7.04	7.27	7.40	4	CSLAP pH
1996	7.06	7.24	7.44	7	CSLAP pH
1995	7.01	7.24	7.51	7	CSLAP pH
1994	7.03	7.25	7.36	8	CSLAP pH
1993	6.79	7.38	7.74	8	CSLAP pH
1992	6.83	7.33	7.70	8	CSLAP pH
1986	6.30	6.88	7.35	3	LCI
1985	6.85	6.97	7.08	2	ALSC
1984	7.50	7.50	7.50	1	ELS
Year	Min	Avg	Max	N	Parameter
1992-07	46	110	228	81	CSLAP Cond25
2007	74	126	163	8	CSLAP Cond25
2006	46	102	171	8	CSLAP Cond25
2005	69	123	228	8	CSLAP Cond25
2004	88	118	135	7	CSLAP Cond25
2003	139	144	149	8	CSLAP Cond25
2002	136	140	142	4	CSLAP Cond25
1996	92	98	106	7	CSLAP Cond25
1995	96	98	102	7	CSLAP Cond25
1994	82	88	92	8	CSLAP Cond25
1993	92	95	98	8	CSLAP Cond25
1992	93	96	99	8	CSLAP Cond25
1986	65	69	73	4	LCI
1985	64	67	70	2	ALSC
1984	61	61	61	1	ELS
Year	Min	Avg	Max	N	Parameter
1992-07	0.24	5.98	25.65	74	CSLAP Chl.a
2007	0.24	3.12	8.79	8	CSLAP Chl.a
2006	1.05	4.05	8.92	8	CSLAP Chl.a
2005	1.00	1.51	2.45	7	CSLAP Chl.a
2004	1.94	6.31	10.90	3	CSLAP Chl.a
2003	4.13	14.82	25.65	7	CSLAP Chl.a
2002	11.32	13.61	15.50	3	CSLAP Chl.a
1996	2.90	9.05	24.00	7	CSLAP Chl.a
1995	1.97	4.25	8.27	8	CSLAP Chl.a
1994	2.52	7.22	16.60	8	CSLAP Chl.a
1993	1.31	2.79	5.82	8	CSLAP Chl.a
1992	2.74	4.85	8.24	7	CSLAP Chl.a
1986	2.50	2.78	3.60	4	LCI

TABLE 2: CSLAP Data Summary for Otter Lake (cont)

Year	Min	Avg	Max	N	Parameter
1992-07	1	2.7	4	81	QA
2007	3	3.0	3	8	QA
2006	3	3.5	4	8	QA
2005	3	3.3	4	8	QA
2004	3	3.3	4	7	QA
2003	2	3.0	4	8	QA
2002	3	3.0	3	5	QA
1996	1	2.1	3	7	QA
1995	1	1.6	2	8	QA
1994	1	2.4	3	7	QA
1993	2	2.5	3	8	QA
1992	2	2.3	3	7	QA
Year	Min	Avg	Max	N	Parameter
1992-07	1	3.0	4	81	QB
2007	1	2.0	3	8	QB
2006	2	3.3	4	8	QB
2005	3	3.0	3	8	QB
2004	3	3.0	3	7	QB
2003	2	2.9	4	8	QB
2002	3	3.0	3	5	QB
1996	2	3.0	4	7	QB
1995	3	3.0	3	8	QB
1994	3	3.1	4	7	QB
1993	1	2.9	4	8	QB
1992	3	3.6	4	7	QB
Year	Min	Avg	Max	N	Parameter
1992-07	1	2.9	4	81	QC
2007	3	3.1	4	8	QC
2006	3	3.8	4	8	QC
2005	3	3.9	4	8	QC
2004	4	4.0	4	7	QC
2003	3	3.4	4	8	QC
2002	3	3.0	3	5	QC
1996	1	2.3	3	7	QC
1995	1	1.6	2	8	QC
1994	2	2.1	3	7	QC
1993	1	2.4	3	8	QC
1992	1	2.6	4	7	QC

- Statistical analyses.** True assessments of water-quality trends and comparison to other lakes involve rigid statistical analyses. Such analyses are generally beyond the scope of this program, in part due to limitations on the time available to summarize data from nearly 100 lakes in the five months from data receipt to the next sampling season. This may be due in part to the inevitable inter-lake inconsistencies in sampling dates from year to year and in part to the limited scope of monitoring. Where appropriate, some statistical

summaries, utilizing both parametric and non-parametric statistics, have been provided within the report (primarily in Table 2).

- **Mean versus Median.** Much of the water-quality summary data presented in this report is reported as the mean, or the average of all of the readings in the period in question (summer, annual, year to year). However, while mean remains one of the most useful, and often most powerful, ways to estimate the most typical reading for many of the measured water-quality indicators, it is a less useful and perhaps misleading estimate when the data are not “normally” distributed (most common readings in the middle of the range of all readings, with readings less common toward the end of the range).

In particular, comparisons of one lake to another, such as comparisons within a particular basin, can be greatly affected by the spread of the data across the range of all readings. For example, the average phosphorus level of nine lakes with very low readings (say 10 $\mu\text{g/l}$) and one lake with very high readings (say 110 $\mu\text{g/l}$) could be much higher (in this case, 20 $\mu\text{g/l}$) than in the “typical lake” in this set of lakes (much closer to 10 $\mu\text{g/l}$). In this case, median, or the middle reading in the range, is probably the most accurate representation of “typical”.

This report will include the use of both mean and median to evaluate “central tendency,” or the most typical reading, for the indicator in question. In most cases, “mean” is used most often to estimate central tendency. However, where noted, “median” may also be used.

**TABLE 3- Current and Historical Data Summaries for Otter Lake
Eutrophication Indicators**

Parameter	Year	Minimum	Average	Maximum
Zsd	2007	1.75	1.91	2.25
(meters)	All Years	1.40	2.17	3.30
Parameter	Year	Minimum	Average	Maximum
Phosphorus	2007	0.017	0.022	0.031
(mg/l)	All Years	0.004	0.012	0.031
Parameter	Year	Minimum	Average	Maximum
Chl.a	2007	0.24	3.12	8.79
(µg/l)	All Years	0.24	5.98	25.65

Parameter	Year	Was 2007 Clarity the Highest or Lowest on Record?	Was 2007 a Typical Year?	Trophic Category	Zsd Changing?	% Samples Violating DOH Beach Std?+
Zsd	2007	Within Normal Range	Lower Than Normal	Eutrophic	No	0
(meters)	All Years			Mesotrophic		0
Parameter	Year	Was 2007 TP the Highest or Lowest on Record?	Was 2007 a Typical Year?	Trophic Category	TP Changing?	% Samples Exceeding TP Guidance Value
Phosphorus	2007	Highest at Times	No	Eutrophic	No	75
(mg/l)	All Years			Mesotrophic		7
Parameter	Year	Was 2007 Algae the Highest or Lowest on Record?	Was 2007 a Typical Year?	Trophic Category	Chl.a Changing?	
Chl.a	2007	Lowest at Times	Yes	Mesotrophic	No	
(µg/l)	All Years			Mesotrophic		

Minimum allowable water clarity for siting a new NYS swimming beach = 1.2 meters
 NYS Total Phosphorus Guidance Value for Class B and Higher Lakes = 0.020 mg/l

The CSLAP dataset usually indicates that Otter Lake is a *mesoeutrophic*, or moderately to highly productive lake, based on water clarity and total phosphorus readings (*mesoeutrophic*) and chlorophyll *a* readings (*mesotrophic*). The lake was probably slightly more productive in 2007 than in the typical CSLAP sampling season. Phosphorus readings were substantially higher—the highest recorded at the lake since at least 1992—and water clarity was lower than normal. The latter may have been due to higher water color, since chlorophyll *a* readings were lower than normal. Phosphorus readings have increased over the last six years, coincident with a long-term decrease in water transparency (and increase in water color) over the same period. There is little connection between changes in algae and nutrients, and between changes in algae and water clarity, although there is a moderately strong correlation between changes in water color and changes in water transparency. As such, any management activities driven by the desire to improve water transparency readings may not likely be successful due to the impact of water color on water clarity, although nutrient controls may reduce the frequency or intensity of algal blooms. Phosphorus levels increase slightly into mid-summer, and then decrease into the fall. A similar pattern occurs with algae, although the peak algal densities occur earlier in the summer. Phosphorus readings regularly exceeded the state guidance value for lakes used for contact recreation (swimming) in 2007, but water clarity readings still exceeded the minimum recommended readings for swimming beaches (= 1.2 meters). In short, Otter Lake was probably more productive in 2007 than in most previous years, based on higher phosphorus and lower water clarity readings.

**TABLE 4- Current and Historical Data Summaries for Otter Lake (cont.)
Other Water-Quality Indicators**

Parameter	Year	Minimum	Average	Maximum
Nitrate	2007	0.01	0.02	0.04
(mg/l)	All Years	0.00	0.02	0.44
Parameter	Year	Minimum	Average	Maximum
NH ₄	2007	0.01	0.04	0.11
(mg/l)	All Years	0.01	0.04	0.14
Parameter	Year	Minimum	Average	Maximum
TDN	2007	0.46	0.67	0.78
(mg/l)	All Years	0.10	0.51	0.99
Parameter	Year	Minimum	Average	Maximum
True Color	2007	1	76	145
(ptu)	All Years	1	46	145
Parameter	Year	Minimum	Average	Maximum
pH	2007	7.37	7.68	8.33
(std units)	All Years	3.74	7.22	8.58
Parameter	Year	Minimum	Average	Maximum
Conductivity	2007	74	126	163
(µmho/cm)	All Years	46	110	228
Parameter	Year	Minimum	Average	Maximum
Calcium	2007	7.8	8.2	8.6
(mg/l)	All Years	3.2	6.5	8.6

These data indicate Otter Lake is a moderately to highly colored, circumneutral to weakly alkaline (near neutral to slightly alkaline pH) lake with low nitrate and moderate ammonia levels, and moderately soft water. Water transparency readings are usually more strongly influenced by water color than algae, and increases in water color readings in Otter Lake have mirrored the rise in water color found in other NYS lakes. As noted above, the rise in color may have contributed to the decrease in water clarity measured in recent years, particularly 2007. Nitrate readings have been close to the analytical detection limit, and ammonia readings have been fairly low but consistently measurable. These data suggest that nitrogen does not represent a problem in Otter Lake. Neither ammonia nor total nitrogen levels have changed significantly in recent years, although nitrate readings have been slightly higher than normal in the last few years. pH readings are indicative of circumneutral to weakly alkaline lakes, and most pH readings have been within the state water quality standards (=6.5 to 8.5). Most conductivity readings have been typical of moderately softwater lakes, and have been slightly higher (and more variable) in recent years. The latter may be coincident with the rise in phosphorus and color over the same period. Calcium levels are near the threshold found to support zebra mussels, and these data suggest that zebra mussel infestations are unlikely given the low calcium readings in Otter Lake. With the exception of the aforementioned increase in color and conductivity levels, none of these water quality indicators have exhibited any long-term trends, and the small changes in these indicators from year to year is probably within the normal range of variability for the lake.

**TABLE 4- Current and Historical Data Summaries for Otter Lake (cont.)
Other Water-Quality Indicators (cont)**

Parameter	Year	Was 2007 Nitrate the Highest or Lowest on Record?	Was 2007 a Typical Year?	Nitrate High?	Nitrate Changing?	% Samples Exceeding NO3 Standard	
Nitrate	2007	Within Normal Range	Yes	No	No	0	
(mg/l)	All Years			No		0	
Parameter	Year	Was 2007 NH4 the Highest or Lowest on Record?	Was 2007 a Typical Year?	NH4 High?	NH4 Changing?	% Samples Exceeding NH4 Standard	
NH4	2007	Within Normal Range	Yes	No	No	0	
(mg/l)	All Years			No		0	
Parameter	Year	Was 2007 TDN the Highest or Lowest on Record?	Was 2007 a Typical Year?	TDN High?	TDN Changing?	Ratios of TN/TP Indicate P or N Limitation?	
TDN	2007	Within Normal Range	Higher than Normal	Yes	No	P Limitation	
(mg/l)	All Years			Yes		P Limitation	
Parameter	Year	Was 2007 Color the Highest or Lowest on Record?	Was 2007 a Typical Year?	Colored Lake?	Color Changing?		
True Color	2007	Both Highest and Lowest at Times	Yes	Yes	Yes		
(ptu)	All Years			Yes			
Parameter	Year	Was 2007 pH the Highest or Lowest on Record?	Was 2007 a Typical Year?	Acceptable Range?	pH Changing?	% Samples > Upper pH Standard	% Samples < Lower pH Standard
pH	2007	Within Normal Range	Higher than Normal	Yes	No	0	0
(std units)	All Years			Yes		1	4
Parameter	Year	Was 2007 Conductivity Highest or Lowest on Record?	Was 2007 a Typical Year?	Relative Hardness	Conductivity Changing?		
Conductivity	2007	Within Normal Range	Yes	Intermediate	No		
(µmho/cm)	All Years			Softwater	No		
Parameter	Year	Was 2007 Calcium Highest or Lowest on Record?	Was 2007 a Typical Year?	Support Zebra Mussels?	Calcium Changing?		
Calcium	2007	Highest at Times	Yes	Uncertain	No		
(mg/l)	All Years			No			

NYS Nitrate standard = 10 mg/l
 NYS Ammonia standard = 2 mg/l (as NH₃-NH₄)
 NYS pH standard- 6.5 < acceptable pH < 8.5

TABLE 5- Current and Historical Data Summaries for Otter Lake

Lake Perception Indicators (1= most favorable, 5= least favorable)

Parameter	Year	Minimum	Average	Maximum
QA	2007	3	3.0	3
(Clarity)	All Years	1	2.7	4
Parameter	Year	Minimum	Average	Maximum
QB	2007	1	2.0	3
(Plants)	All Years	1	3.0	4
Parameter	Year	Minimum	Average	Maximum
QC	2007	3	3.1	4
(Recreation)	All Years	1	2.9	4

Parameter	Year	Was 2007 Clarity the Highest or Lowest on Record?	Was 2007 a Typical Year?	Clarity Changed?	%Frequency 'Definite Algae Greenness'	%Frequency 'Severe Algae Levels'	%Frequency 'Slightly Impaired' Due to Algae	%Frequency 'Substantially Impaired' Due to Algae
QA	2007	Within Normal Range	Yes	Yes	100	0	100	13
(Clarity)	All Years				67	14	60	28
Parameter	Year	Was 2007 Weed Growth the Heaviest on Record?	Was 2007 a Typical Year?	Weeds Changed?	%Frequency Surface Weeds	%Frequency Dense Weeds	%Frequency 'Slightly Impaired' Due to Weeds	%Frequency 'Substantially Impaired' Due to Weeds
QB	2007	Lightest at Times	Less Weedy Than Normal	No	13	0	38	13
(Plants)	All Years				85	14	59	29
Parameter	Year	Was 2007 Recreation the Best or Worst on Record?	Was 2007 a Typical Year?	Recreation Changed?	%Frequency Slightly Impaired	%Frequency Substantially Impaired		
QC	2007	Worst at Times	Yes	Yes	100	13		
(Recreation)	All Years				69	31		

Otter Lake has most frequently been described as having “definite algal greenness, yellowness, or brownness,” assessments comparable to those in other lakes with similar water clarity and color readings. These assessments were slightly less favorable than normal in 2007, though more favorable than in most recent years, consistent with water clarity readings that were lower and water color that was higher than normal. Aquatic plants densities and coverage were substantially lower than normal in 2007, probably due to the grass carp herbivory. Surface plant growth was limited to early in the summer, suggesting increased herbivory as the carp grew and moved throughout the lake. “Excessive weed growth” is regularly implicated in recreational use impacts in the lake, though less so in 2007, but poor water clarity was more frequently cited in 2007. Otter Lake continues to most frequently be reported as “slightly” impaired for most recreational uses, consistent with other lakes impacted by algae, water color, and/or nuisance weeds. Recreational, water quality and aquatic plant assessments are usually fairly stable during the summer.

Otter Lake has been described by the CSLAP sampling volunteers as “slightly” impaired during 69% of the CSLAP sampling sessions and “substantially” impaired 31% of the time. Slightly impaired conditions have been associated with poor water clarity and excessive weeds 60% and 59% of the time, respectively. Substantially impaired conditions were associated with poor water clarity and excessive weeds 28% and 29% of the time.

How Do the 2007 Data Compare to Historical Data from Otter Lake?

Seasonal Comparison of Eutrophication, Other Water-quality, and Lake-Perception Indicators—2007 Sampling Season and in the Typical or Previous Sampling Seasons at Otter Lake

Figures 23 and 24 compare data for the measured eutrophication parameters for Otter Lake in 2007 and since CSLAP sampling began at Otter Lake. Figures 25 and 26 compare nitrogen to phosphorus ratios, figures 27 through 34 compare other sampling indicators, and figures 35 and 36 compare volunteer perception responses during the same periods.

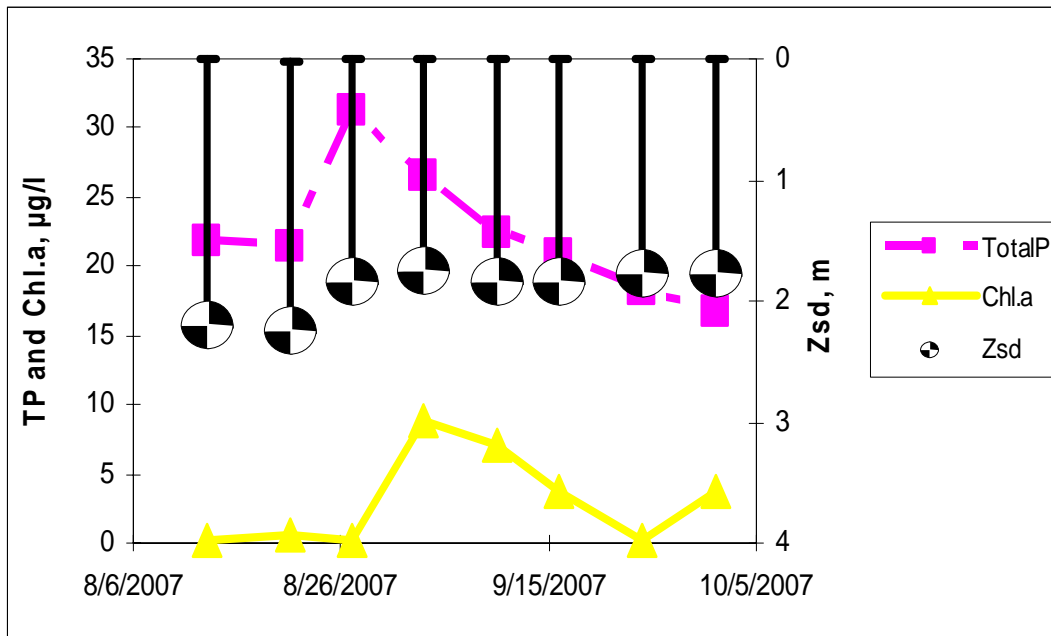


Figure 23- 2007 Eutrophication Data for Otter Lake

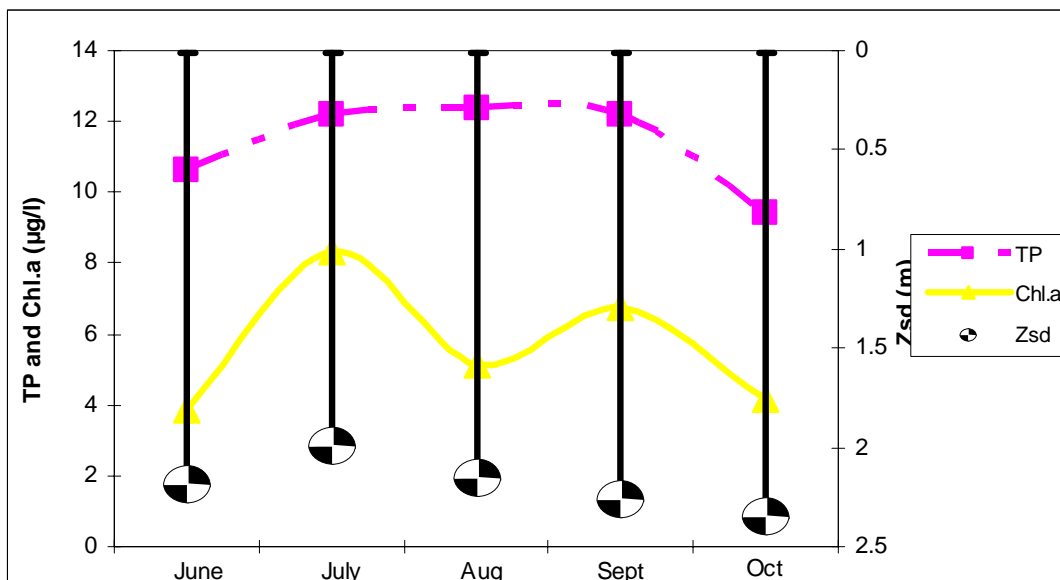


Figure 24- Eutrophication Data in a Typical (Monthly Mean) Year for Otter Lake

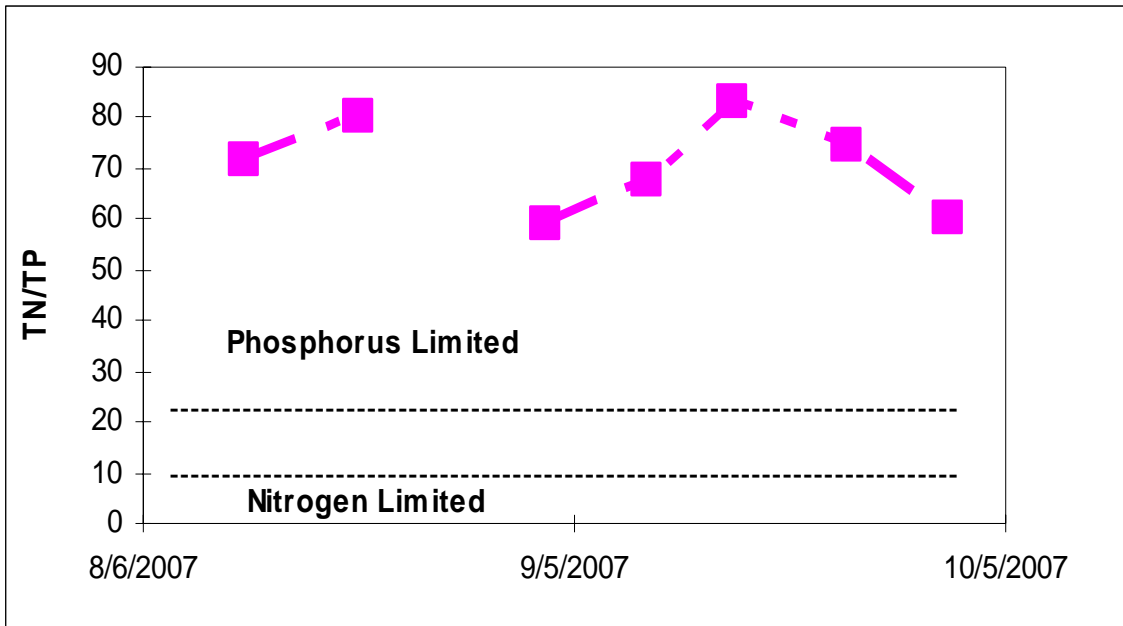


Figure 25. 2007 Nitrogen-to-Phosphorus Ratios for Otter Lake

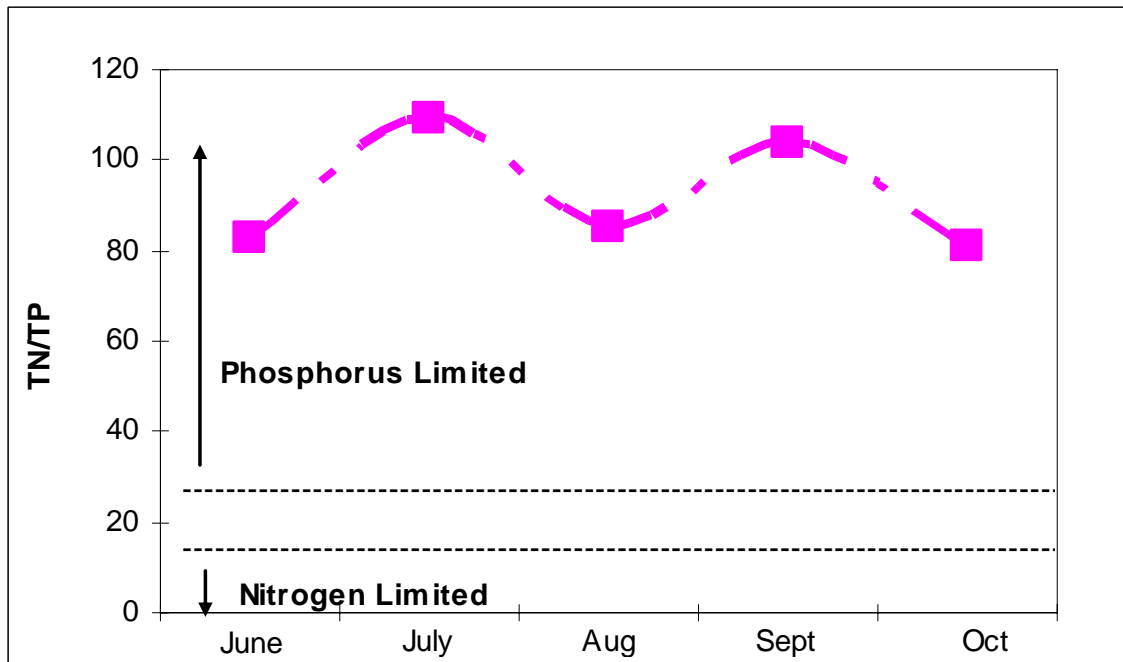


Figure 26- Nitrogen-to-Phosphorus Ratios in a Typical (Monthly Mean) Year for Otter Lake

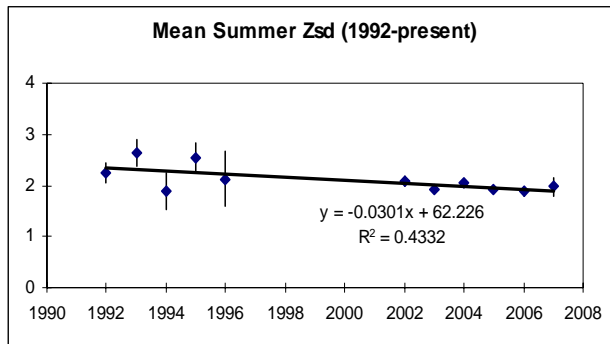


Figure 27. Annual Average Summer Water Clarity for Otter Lake

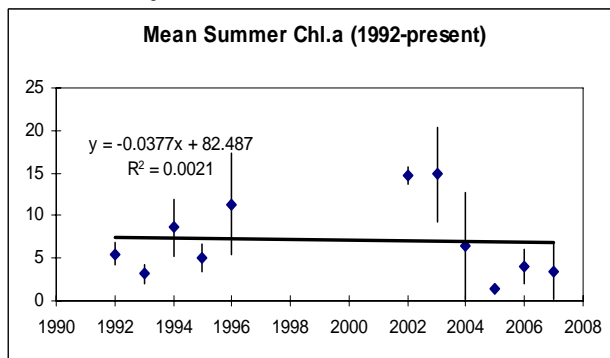


Figure 28. Annual Average Summer Chlorophyll a for Otter Lake

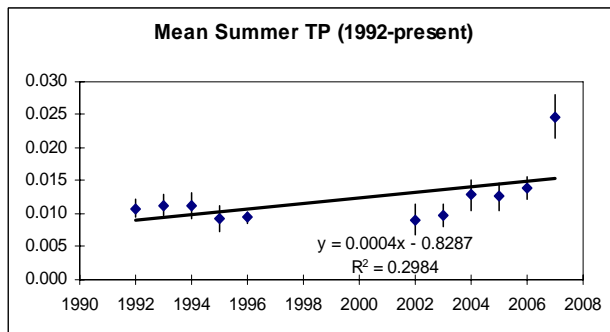


Figure 29. Annual Average Summer Total Phosphorus for Otter Lake

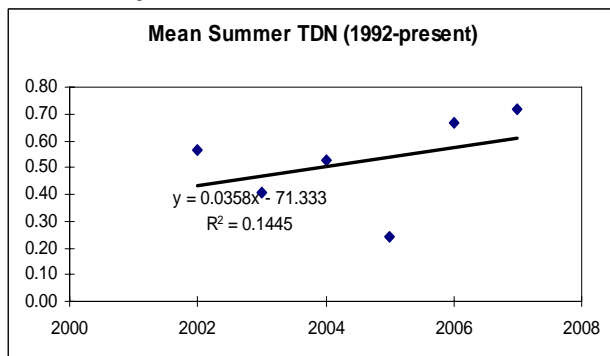


Figure 30. Annual Average Summer Total Nitrogen for Otter Lake

Annual Averages, 1992-present

Wettest Years: 1994, 1996, and 2006
 Driest Years: 1995
 Highest Clarity: 1993, 1995
 Lowest Clarity: 2003, 2005, 2006
 Long Term Trend?: Decreasing?
Discussion: Water clarity readings have been lower in the last six years (2002-present) than in the first five years (1992-96) of CSLAP sampling. This may represent a long-term pattern.

Wettest Years: 1994, 1996, and 2006
 Driest Years: 1995
 Highest Chl.a: 2003, 2002, 1996
 Lowest Chl.a: 2005, 1993, 2007, 2006
 Long Term Trend?: None apparent
Discussion: Chlorophyll a readings have varied, at times significantly, from year to year in a manner that is not predictable and is probably not statistically significant.

Wettest Years: 1994, 1996, and 2006
 Driest Years: 1995
 Highest TP: 2007, 2006
 Lowest TP: 2002, 1995, 1996, 2003
 Long Term Trend?: Increasing?
Discussion: Phosphorus readings were consistently and substantially higher in 2007 than in previous years, and may be part of a recent (since 2002) pattern of increasing phosphorus levels in Otter Lake. However, this has not triggered a similar change in chlorophyll a levels, although color readings have similarly changed.

Wettest Years: 1994, 1996, and 2006
 Driest Years: 1995
 Highest Total N: 2007, 2006
 Lowest Total N: 2005
 Long Term Trend?: None apparent
Discussion: Total nitrogen readings were higher in the last two years than in previous years, but it is not likely that this is indicative of a long-term trend.

Annual Averages, 1992-present

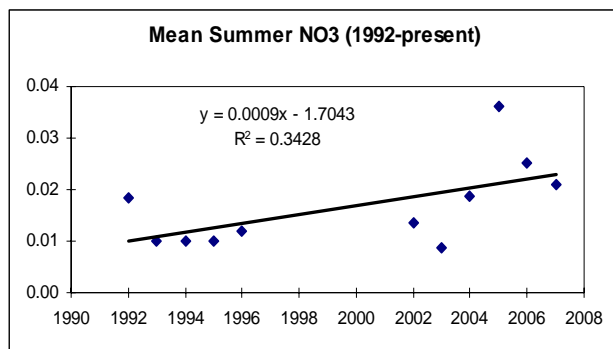


Figure 31. Annual Average Summer Nitrate for Otter Lake

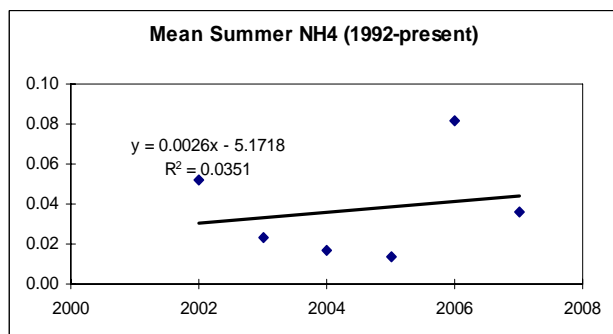


Figure 32. Annual Average Summer Ammonia for Otter Lake

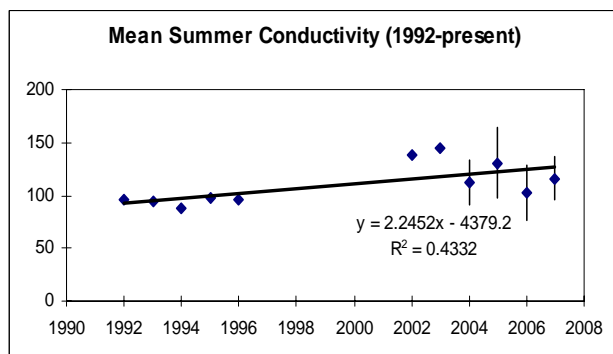


Figure 33. Annual Average Summer Conductivity for Otter Lake

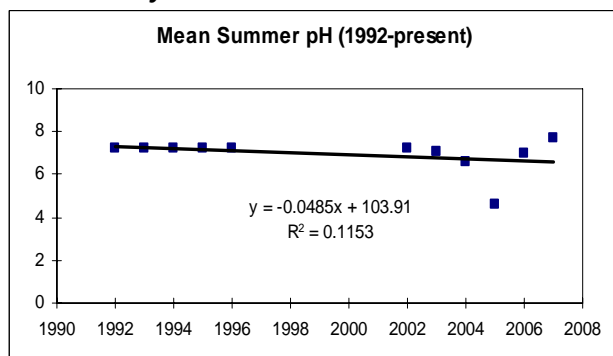


Figure 34. Annual Average Summer pH for Otter Lake

Wettest Years: 1994, 1996, and 2006

Driest Years: 1995

Highest Nitrate: 2005, 2006, 2007

Lowest Nitrate: 2003

Long Term Trend?: Increasing?

Discussion: Nitrate readings have been higher in the last four years than in previous CSLAP sampling seasons. It is not yet known if this is related to the increase in color and phosphorus readings in recent years.

Wettest Years: 1994, 1996, and 2006

Driest Years: 1995

Highest Ammonia: 2006

Lowest Ammonia: 2005, 2004, 2003

Long Term Trend?: None apparent

Discussion: Ammonia readings have varied from year to year, with no apparent long-term trend, although these readings are usually higher than in the typical CSLAP sampling season.

Wettest Years: 1994, 1996, and 2006

Driest Years: 1995

Highest Cond.: 2003, 2002

Lowest Cond.: 1994, '93, '96, '92, '95

Long Term Trend?: Increasing?

Discussion: Conductivity readings have been more variable than usual in the last four years, but most readings in this period have been higher than in the typical CSLAP sampling season.

Wettest Years: 1994, 1996, and 2006

Driest Years: 1995

Highest pH: 2007

Lowest pH: 2005

Long Term Trend?: None apparent

Discussion: pH readings have varied slightly from year to year in a manner that does not appear to be statistically significant. Readings were higher in 2007 than in previous years, but pH has been fairly stable during most of the period from 1992 to 2007.

Annual Averages, 1992-present

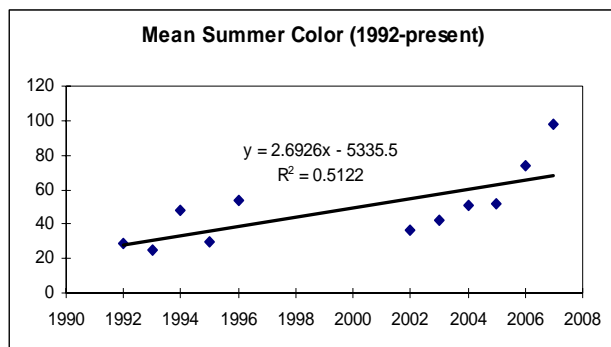


Figure 35. Annual Average Summer Color for Otter Lake

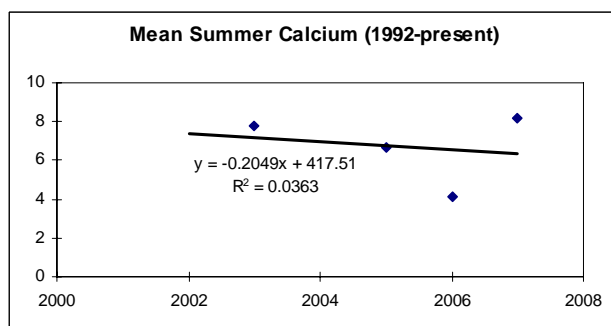


Figure 36. Annual Average Summer Calcium for Otter Lake

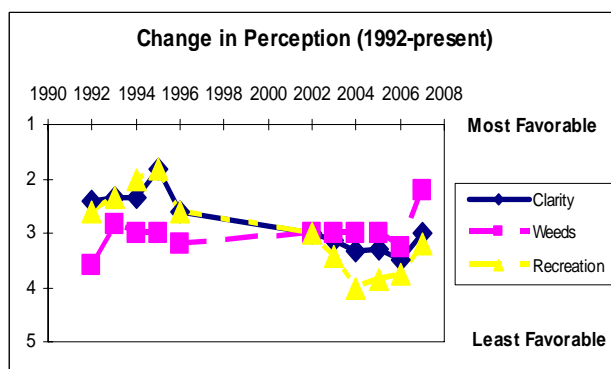


Figure 37. Annual Average Summer Lake Perception for Otter Lake

(QA = clarity, ranging from (1) crystal clear to (3) definite algae greenness to (5) severely high algae levels;
 QB = weeds, ranging from (1) not visible to (3) growing to the surface to (5) dense growth covers lake;
 QC = recreation, ranging from (1) could not be nicer to (3) slightly impaired to (5) lake not usable)

Wettest Years: 1994, 1996, and 2006
 Driest Years: 1995
 Highest Color: 2007, 2006, 2005
 Lowest Color: 1993, 1992, 1995
 Long Term Trend?: Increasing

Discussion: Color readings have increased in the last six years, and may have contributed to the decrease in transparency. It is likely that the rise in color is coincident with wetter weather, heavier runoff, and the increase in phosphorus levels, particularly in 2007.

Wettest Years: 1994, 1996, and 2006
 Driest Years: 1995
 Highest Calcium: 2007, 2003
 Lowest Calcium: 2006
 Long Term Trend?: None apparent

Discussion: Calcium readings have varied slightly from year to year in manner that is probably not statistically significant.

Wettest Years: 1994, 1996, and 2006
 Driest Years: 1995
 Most Favorable WQ: 1995, 1992-94
 Least Favorable WQ: 2006, 2005, 2004
 Highest Weed Cov. 1992, 1996
 Lowest Weed Cov. 2007
 Most Favorable Rec. 1995, 1994
 Least Favorable Rec. 2004, 2005, 2006
 Long Term Trend?: Highly variable

Discussion: Recreational assessments have varied closely in response to changes in water quality conditions, although the lake has actively managed to deal with the invasive weed problem in recent years.

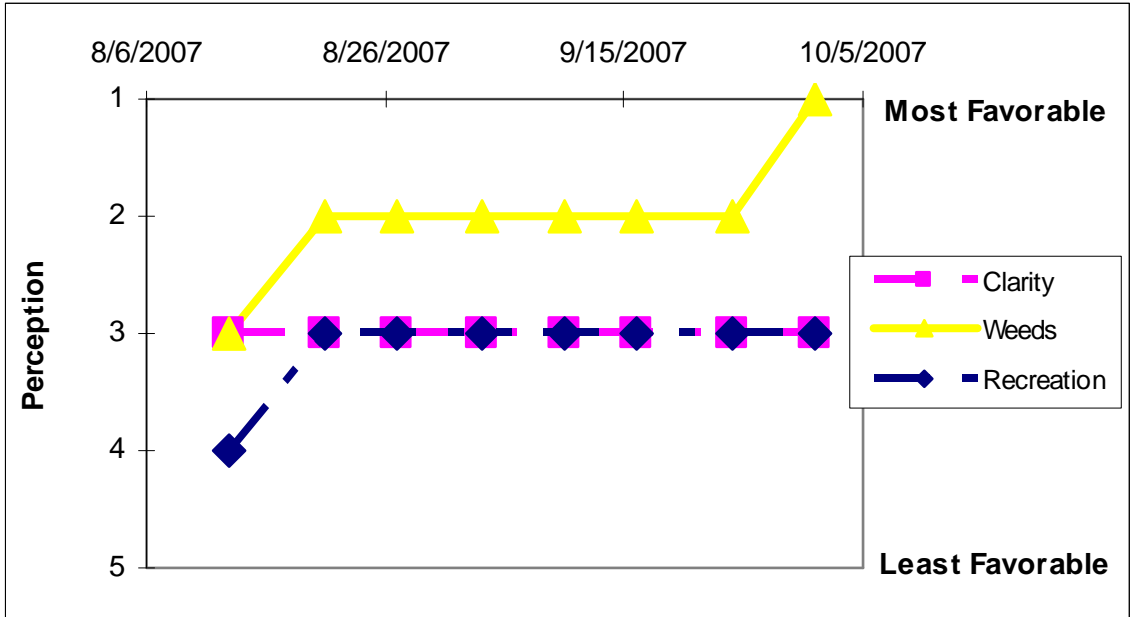


Figure 38. 2007 Lake Perception Data for Otter Lake

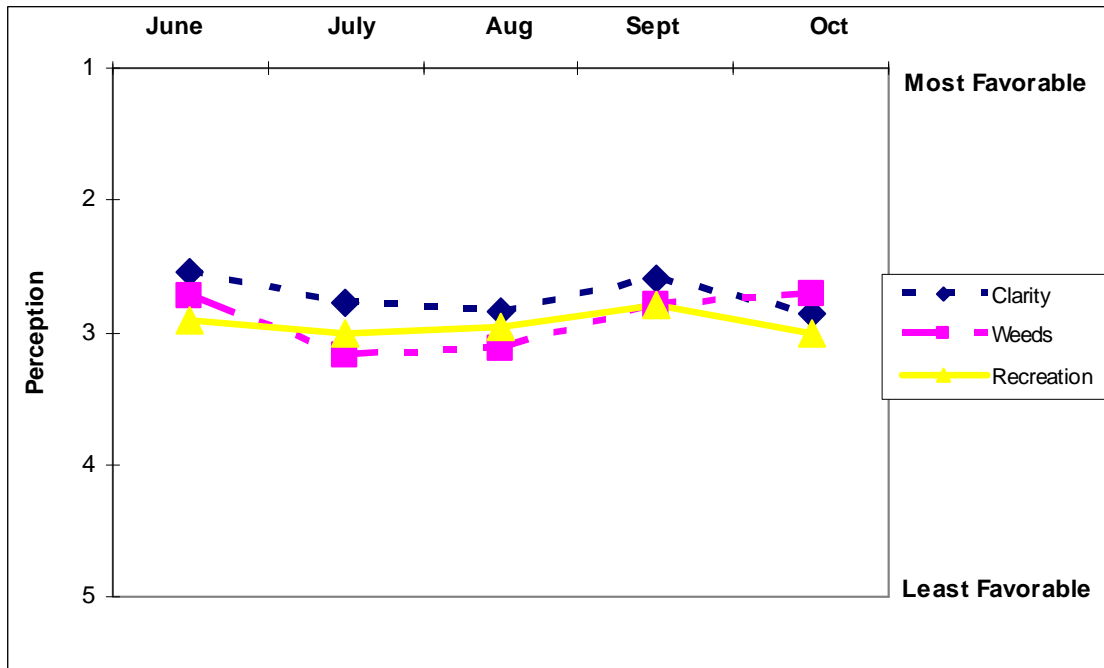


Figure 39- Lake Perception Data in a Typical (Monthly Mean) Year for Otter Lake

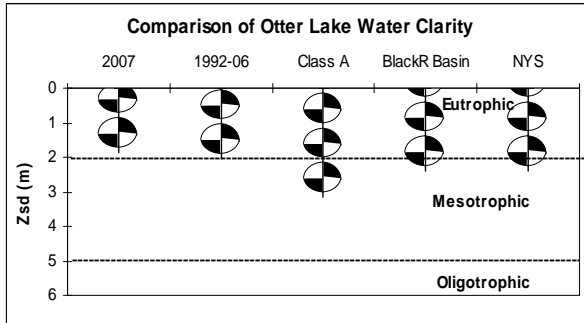


Figure 40. Comparison of 2007 Secchi Disk Transparency to Lakes With the Same Water-Quality Classification, Neighboring Lakes, and Other CSLAP Lakes

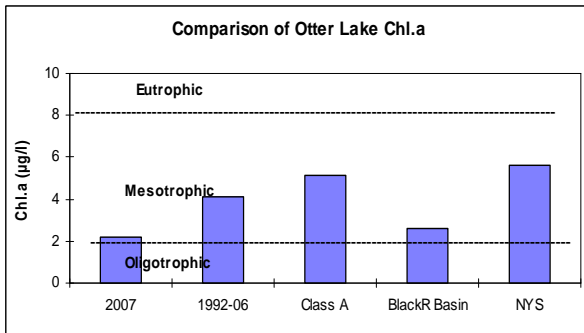


Figure 41. Comparison of 2007 Chlorophyll *a* to Lakes with the Same Water-Quality Classification, Neighboring Lakes, and Other CSLAP Lakes

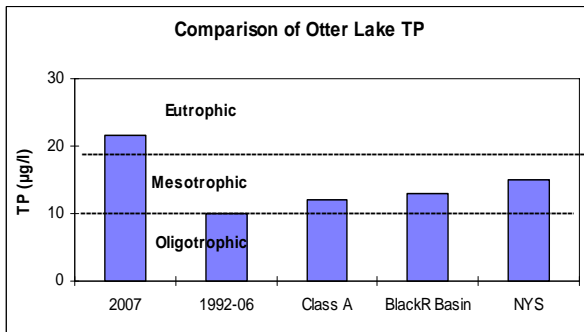


Figure 42. Comparison of 2007 Total Phosphorus to Lakes With the Same Water-Quality Classification, Neighboring Lakes, and Other CSLAP Lakes

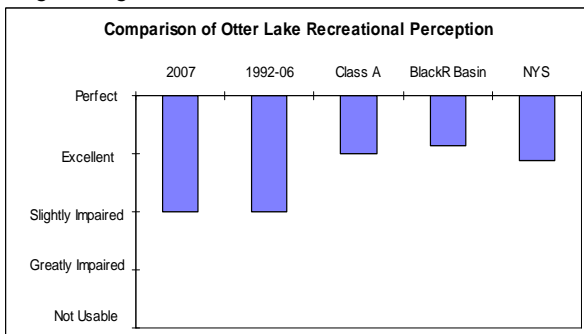


Figure 43. Comparison of 2007 Recreational Perception to Lakes With the Same Water-Quality Classification, Neighboring Lakes, and Other CSLAP Lakes

How does Otter Lake compare to other lakes?

Annual Comparison of Median Readings for Eutrophication Parameters and Recreational Assessment For Otter Lake in 2007 to Historical Data for Otter Lake, Neighboring Lakes, Lakes with the Same Lake Classification, and Other CSLAP Lakes

The graphs to the left illustrate comparisons of each eutrophication parameter and recreational perception at Otter Lake—in 2007, other lakes in the same drainage basin, lakes with the same water-quality classification (each classification is summarized in Appendix B), and all of CSLAP. Readers should note that differences in watershed types, activities, lake history and other factors may result in differing water-quality conditions at your lake relative to other nearby lakes. In addition, the limited database for some regions of the state precludes a comprehensive comparison to neighboring lakes.

Based on these graphs, the following conclusions can be made about Otter Lake in 2007:

- Using water clarity as an indicator, Otter Lake is more productive than other Black River basin lakes, other Class A lakes, and other NYS lakes.
- Using chlorophyll *a* concentrations as an indicator, Otter Lake is usually more productive than other Black River basin lakes, and less productive than other Class A lakes and other NYS lakes, although the lake was less productive than other Black River basin lakes in 2007.
- Using total phosphorus concentrations as an indicator, Otter Lake is usually less productive than other Black River basin lakes, other Class A lakes, and other NYS lakes, although in 2007, it was more productive than other lakes in each of these categories.
- Using QC on the field-observations form as an indicator, Otter Lake is more suitable for recreation than other NYS lakes, other Class A lakes, and other Black River basin lakes.

Appendix A. Raw Data for Otter Lake

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
99	Otter L	6/14/1992	2.8	2.38	1.5	0.011	0.01				29	7.23	93		2.74
99	Otter L	7/1/1992		2.42	1.5	0.012	0.01				26	7.43	99		
99	Otter L	7/12/1992	3.0	2.60	1.5	0.012	0.01				25	7.70	98		4.94
99	Otter L	8/1/1992	3.0	2.13	1.5	0.012	0.06				32	7.61	95		5.70
99	Otter L	8/9/1992	2.9	2.13	1.5	0.012	0.01				30	7.04	93		4.07
99	Otter L	8/23/1992	2.5	1.83	1.5	0.008	0.01				30	6.83	96		4.73
99	Otter L	9/6/1992	2.8	2.38	1.5	0.009	0.01				30	7.42	94		8.24
99	Otter L	9/20/1992	2.0	2.25	1.5	0.009	0.01				35	7.41	96		3.55
99	Otter L	7/5/1993	3.1	2.28	1.5	0.013	0.01				27	7.64	92		3.10
99	Otter L	7/18/1993	2.7	2.35	1.5	0.011					27	6.79	94		5.82
99	Otter L	8/1/1993	3.1	2.73	1.5	0.012	0.01				18	7.16	96		2.23
99	Otter L	8/15/1993	3.3	3.00	1.5	0.008					22	7.62	95		1.88
99	Otter L	8/29/1993	3.3	3.05	1.5	0.010	0.01				22	7.59	98		2.05
99	Otter L	9/12/1993	3.2	2.40	1.5	0.014					31	7.22	94		4.01
99	Otter L	9/26/1993	2.8	2.60	1.5	0.008	0.01				24	7.74	95		1.92
99	Otter L	10/11/1993	3.2	3.20	1.5	0.008					29	7.31	96		1.31
99	Otter L	6/12/1994	3.3	2.65	1.5	0.013	0.01				32	7.20	90		3.62
99	Otter L	6/19/1994	3.3	2.20	1.5	0.008					27	7.17	92		6.77
99	Otter L	7/10/1994	3.3	1.40	1.5	0.015	0.01				53	7.35	82		11.60
99	Otter L	7/24/1994	3.0	1.40	1.5	0.013	0.01				53	7.03	86		16.60
99	Otter L	8/13/1994	3.0	1.60	1.5	0.012	0.01				55	7.35	90		6.35
99	Otter L	8/28/1994	3.0	2.25	1.5	0.010					55	7.25	88		5.47
99	Otter L	9/5/1994	3.0	2.50	1.5	0.009	0.01				45	7.25	89		4.85
99	Otter L	10/2/1994	3.3	2.20	1.5	0.010					55	7.36	85		2.52
99	Otter L	7/8/1995	3.3	2.30	1.5	0.014	0.01				30	7.20	96		8.27
99	Otter L	7/22/1995	3.4	2.40	1.5	0.008	0.01				25	7.01	96		3.73
99	Otter L	8/1/1995	3.2	2.40		0.010	0.01				30				4.25
99	Otter L	8/14/1995	3.1	3.10	1.5	0.010	0.01				35	7.51	98		3.89
99	Otter L	8/27/1995	3.1	2.10	1.5	0.006	0.01				30	7.28	102		7.19
99	Otter L	9/12/1995	3.3	3.00	1.5	0.008	0.01				30	7.29	98		2.55
99	Otter L	9/24/1995	3.3	3.30	1.5	0.007	0.01				25	7.19	99		2.13
99	Otter L	10/8/1995	3.3	3.30	1.5	0.004	0.01				25	7.22	99		1.97
99	Otter L	6/9/1996	3.0	3.00	1.5	0.009	0.01				30	7.06	99		2.90
99	Otter L	7/7/1996	3.0	1.50	1.5	0.010	0.02				50	7.07	92		8.50
99	Otter L	7/24/1996	3.0	2.00	1.5	0.009	0.01				60	7.27	94		24.00
99	Otter L	8/7/1996			1.5	0.011	0.01				60	7.31	97		9.30
99	Otter L	8/21/1996	3.0	2.00	1.5	0.009	0.01				55	7.44	98		11.20
99	Otter L	9/2/1996	3.0	3.00	1.5	0.008	0.01				45	7.25	99		3.70
99	Otter L	9/23/1996	3.0	3.00	1.5	0.015	0.01				30	7.28	106		3.72
99	Otter L	7/22/2002	2.3	2.25	1.5	0.006	0.00	0.10	0.63	225.21	42	7.04	136		
99	Otter L	8/6/2002	2.0	2.10	1.5	0.007	0.00	0.04	0.60	176.56	43	7.33	139		15.50
99	Otter L	8/20/2002	1.8	1.90	1.5	0.011	0.00	0.05	0.54	107.57	23	7.29	142		
99	Otter L	9/3/2002	2.1	2.10	1.5	0.012	0.00	0.03	0.49	91.20	37				14.00
99	Otter L	9/15/2002	2.1	2.00	1.5		0.06	0.04	0.57						
99	Otter L	10/1/2002	2.1	2.10	1.5	0.010	0.00	0.01	0.57	125.19	28	7.40	141		11.32
99	Otter L	10/29/2002	1.9	2.00			0.04	0.05	0.52						
99	Otter L	6/10/2003		2.00	1.5	0.007	0.01	0.03	0.37	117.73	42	6.87	139	6.4	
99	Otter L	6/24/2003		1.90	1.5	0.010	0.00	0.03	0.32	70.02	51	6.88	139		14.27
99	Otter L	7/8/2003		1.85	1.5	0.013	0.03	0.05	0.45	74.73	40	7.23	148		25.45
99	Otter L	7/23/2003		2.00	1.5	0.011	0.01	0.03	0.40	80.39	44	7.04	144		4.13
99	Otter L	8/5/2003		2.00	1.5	0.010	0.00	0.01	0.54	118.89	39	7.04	148	7.8	14.20
99	Otter L	8/19/2003		2.00	1.5	0.008	0.00	0.02	0.38	104.62	48	6.99	143		9.26
99	Otter L	9/2/2003		1.85	1.5	0.005	0.02	0.01	0.42	174.01	38	6.93	142		10.79
99	Otter L	9/15/2003		1.85	1.5	0.011	0.00	0.01	0.31	63.02	39	7.16	149		25.65
99	Otter L	6/23/2004		2.00	1.5	0.015	0.02	0.01	0.72	108.80	51	6.19	133		1.94
99	Otter L	9/7/2004		2.15	1.5	0.011	0.02	0.03	0.34	68.22	52	7.32	117		10.90
99	Otter L	9/15/2004		2.00	1.5		0.02	0.01	0.53		49	6.90	88		
99	Otter L	9/22/2004		1.95	1.5	0.009	0.01	0.01			53	7.46	117		6.10
99	Otter L	9/29/2004		1.90	1.5	0.009	0.44	0.07	0.99	255.79	75	6.67	118		
99	Otter L	10/6/2004		2.05	1.5	0.009	0.01	0.02	0.20	48.27	47	7.28	117		
99	Otter L	10/12/2004		2.20	1.5	0.008	0.01	0.01	0.34	91.16	49	6.94	135		

LNum	PName	Date	Zbot	Zsd	Zsamp	Tot.P	NO3	NH4	TDN	TN/TP	TColor	pH	Cond25	Ca	Chl.a
99	Otter L	6/2/2005		1.90	1.5	0.009	0.01	0.01	0.22	55.38	80	3.74	228		1.26
99	Otter L	6/28/2005		1.95		0.013	0.04	0.01	0.19	32.46	43	6.37	131	5.5	2.19
99	Otter L	7/12/2005		1.80	1.5	0.015	0.05	0.03	0.20	27.98	43	7.60	130		
99	Otter L	7/19/2005		1.95	1.5	0.009	0.01	0.02	0.47	120.25	37	8.58	114		1.13
99	Otter L	8/8/2005		1.80	1.5	0.014	0.07	0.01	0.21	32.96	42	7.14	127	7.8	1.00
99	Otter L	8/16/2005		1.95	1.5	0.016	0.08	0.01	0.28	37.76	64	7.38	118		1.32
99	Otter L	8/23/2005		2.05	1.5	0.012	0.01	0.01	0.10	18.58	52	7.25	69		1.23
99	Otter L	8/29/2005		1.85	1.5	0.008	0.01	0.01	0.25	67.97	36	7.12	70		2.45
99	Otter L	6/5/2006		2.05	1.5	0.012	0.03	0.05	0.52	93.85			46	5.0	1.05
99	Otter L	6/18/2006	5.6	2.05	1.5	0.010	0.02	0.02	0.47	102.26	64	7.02	126		1.82
99	Otter L	7/11/2006	4.1	1.75	1.5	0.013	0.04	0.08	0.68	117.92	54	7.16	171		1.37
99	Otter L	7/18/2006	5.9	1.95	1.5	0.012			0.76	134.76	66	6.61	76		2.80
99	Otter L	7/25/2006	5.5	1.80	1.5	0.016	0.03	0.10	0.85	120.44	109	7.22	92	3.2	2.96
99	Otter L	7/31/2006	5.7	1.85	1.5	0.019	0.01	0.14	0.69	79.22	62	6.72	117		8.92
99	Otter L	8/7/2006	5.9	1.85	1.5	0.014	0.02	0.13	0.59	90.94	93	7.20	121		7.45
99	Otter L	8/14/2006	5.3	1.70	1.5	0.015	0.02	0.06	0.79	114.99	72	7.60	66		6.06
99	Otter L	8/13/2007		2.20	1.5	0.022	0.01	0.03	0.70	71.07	67	7.58	140	7.8	0.24
99	Otter L	8/21/2007		2.25	1.5	0.022	0.04	0.04	0.78	79.66	81	7.50	133		0.64
99	Otter L	8/27/2007		1.85	1.5	0.031		0.04			93	8.33	74		0.29
99	Otter L	9/3/2007		1.75	1.5	0.027	0.01	0.02	0.70	58.45	104	7.88	120		8.79
99	Otter L	9/10/2007		1.85	1.5	0.022	0.03	0.05	0.68	66.98	145	7.47	111	8.6	7.16
99	Otter L	9/16/2007		1.85	1.5	0.021	0.04	0.05	0.78	82.81	67	7.68	128		3.77
99	Otter L	9/24/2007		1.78	1.5	0.018	0.01	0.01	0.62	74.00	53	7.37	138		0.29
99	Otter L	10/1/2007		1.78	1.5	0.017	0.02	0.11	0.46	59.60	1	7.64	163		3.76

LNum	PName	Date	Zbot	Zsd	Zsamp	TAir	TH20	QA	QB	QC	QD
99	Otter L	6/14/1992	2.8	2.38	1.5	24	21	2	3	3	23
99	Otter L	7/1/1992		2.42	1.5	18	21				
99	Otter L	7/12/1992	3.0	2.60	1.5	25	21	2	4	3	25
99	Otter L	8/1/1992	3.0	2.13	1.5	16	19	2	3	2	1
99	Otter L	8/9/1992	2.9	2.13	1.5	26	21	2	4	3	2
99	Otter L	8/23/1992	2.5	1.83	1.5	24	21	3	4	1	23
99	Otter L	9/6/1992	2.8	2.38	1.5	19	19	3	3	4	2
99	Otter L	9/20/1992	2.0	2.25	1.5	17	18	2	4	2	2
99	Otter L	7/5/1993	3.1	2.28	1.5	30	23	2	3	2	21
99	Otter L	7/18/1993	2.7	2.35	1.5	24	23	2	3	2	12
99	Otter L	8/1/1993	3.1	2.73	1.5	27	25	3	3	3	23
99	Otter L	8/15/1993	3.3	3.00	1.5	33	24	2	4	3	126
99	Otter L	8/29/1993	3.3	3.05	1.5	34	23	3	3	3	12
99	Otter L	9/12/1993	3.2	2.40	1.5	24	20	2	1	1	
99	Otter L	9/26/1993	2.8	2.60	1.5	18	16	3	3	2	25
99	Otter L	10/11/1993	3.2	3.20	1.5	14	11	3	3	3	2
99	Otter L	6/12/1994	3.3	2.65	1.5	26	19	3	4	3	123
99	Otter L	6/19/1994	3.3	2.20	1.5	30	26	3	3	2	12
99	Otter L	7/10/1994	3.3	1.40	1.5	22	23	3	3	2	1
99	Otter L	7/24/1994	3.0	1.40	1.5	24	24	3	3	2	
99	Otter L	8/13/1994	3.0	1.60	1.5	23	22	2	3	2	
99	Otter L	8/28/1994	3.0	2.25	1.5	21	20	2	3	2	5
99	Otter L	9/5/1994	3.0	2.50	1.5	25	17	1	3	2	
99	Otter L	10/2/1994	3.3	2.20	1.5	10	14				
99	Otter L	7/8/1995	3.3	2.30	1.5	18	23	2	3	2	
99	Otter L	7/22/1995	3.4	2.40	1.5	24	27	2	3	2	
99	Otter L	8/1/1995	3.2	2.40				2	3	2	
99	Otter L	8/14/1995	3.1	3.10	1.5	23	26	2	3	2	
99	Otter L	8/27/1995	3.1	2.10	1.5	16	22	2	3	2	
99	Otter L	9/12/1995	3.3	3.00	1.5	21	19	1	3	1	
99	Otter L	9/24/1995	3.3	3.30	1.5			1	3	1	
99	Otter L	10/8/1995	3.3	3.30	1.5	10	10	1	3	1	
99	Otter L	6/9/1996	3.0	3.00	1.5	23	21	1	2	1	
99	Otter L	7/7/1996	3.0	1.50	1.5	24	24	3	4	3	23
99	Otter L	7/24/1996	3.0	2.00	1.5	22	24	3	3	3	123

LNum	PName	Date	Zbot	Zsd	Zsamp	TAir	TH2O	QA	QB	QC	QD
99	Otter L	8/7/1996			1.5			2	3	3	
99	Otter L	8/21/1996	3.0	2.00	1.5	20	25	3	3	2	
99	Otter L	9/2/1996	3.0	3.00	1.5	22	25	2	3	2	
99	Otter L	9/23/1996	3.0	3.00	1.5	17	18	1	3	2	
99	Otter L	7/22/2002	2.3	2.25	1.5	23		3	3	3	23
99	Otter L	8/6/2002	2.0	2.10	1.5	20		3	3	3	237
99	Otter L	8/20/2002	1.8	1.90	1.5	22					
99	Otter L	9/3/2002	2.1	2.10	1.5	24		3	3	3	235
99	Otter L	9/15/2002	2.1	2.00	1.5	20					
99	Otter L	10/1/2002	2.1	2.10	1.5	20		3	3	3	23
99	Otter L	10/29/2002	1.9	2.00		2		3	3	3	123
99	Otter L	6/10/2003		2.00	1.5	20		2	2	3	12
99	Otter L	6/24/2003		1.90	1.5	28		2	2	3	23
99	Otter L	7/8/2003		1.85	1.5	23		2	3	3	1234
99	Otter L	7/23/2003		2.00	1.5	23		3	3	3	1237
99	Otter L	8/5/2003		2.00	1.5	23		4	3	3	235
99	Otter L	8/19/2003		2.00	1.5	23		3	3	4	237
99	Otter L	9/2/2003		1.85	1.5	19		4	4	4	12347
99	Otter L	9/15/2003		1.85	1.5	18		4	3	4	12345
99	Otter L	6/23/2004		2.00	1.5	21		3	3	4	1234
99	Otter L	9/7/2004		2.15	1.5	23		4	3	4	1234
99	Otter L	9/15/2004		2.00	1.5	22		3	3	4	1234
99	Otter L	9/22/2004		1.95	1.5	21		3	3	4	12346
99	Otter L	9/29/2004		1.90	1.5	20		3	3	4	234
99	Otter L	10/6/2004		2.05	1.5	14		4	3	4	1234
99	Otter L	10/12/2004		2.20	1.5	12		3	3	4	1234
99	Otter L	6/2/2005		1.90	1.5	24		3	3	4	1234
99	Otter L	6/28/2005		1.95		27		3	3	3	1234
99	Otter L	7/12/2005		1.80	1.5	29		3	3	4	1234
99	Otter L	7/19/2005		1.95	1.5	28		3	3	4	1234
99	Otter L	8/8/2005		1.80	1.5	27		4	3	4	1234
99	Otter L	8/16/2005		1.95	1.5	21		3	3	4	1234
99	Otter L	8/23/2005		2.05	1.5	21		4	3	4	1234
99	Otter L	8/29/2005		1.85	1.5	23		3	3	4	1234
99	Otter L	6/5/2006		2.05	1.5	22	22	3	2	3	1234
99	Otter L	6/18/2006	5.6	2.05	1.5	30		3	3	3	1234
99	Otter L	7/11/2006	4.1	1.75	1.5	22		3	3	4	12346
99	Otter L	7/18/2006	5.9	1.95	1.5	23		3	3	4	12346
99	Otter L	7/25/2006	5.5	1.80	1.5	26		4	4	4	12346
99	Otter L	7/31/2006	5.7	1.85	1.5	26		4	3	4	123467
99	Otter L	8/7/2006	5.9	1.85	1.5	25		4	4	4	12346
99	Otter L	8/14/2006	5.3	1.70	1.5	20		4	4	4	123467
99	Otter L	8/13/2007		2.20	1.5	21		3	3	4	12346
99	Otter L	8/21/2007		2.25	1.5	19		3	2	3	1234
99	Otter L	8/27/2007		1.85	1.5	21		3	2	3	148
99	Otter L	9/3/2007		1.75	1.5	23		3	2	3	1347
99	Otter L	9/10/2007		1.85	1.5	18		3	2	3	134
99	Otter L	9/16/2007		1.85	1.5	18		3	2	3	123
99	Otter L	9/24/2007		1.78	1.5	22		3	2	3	134
99	Otter L	10/1/2007		1.78	1.5	18		3	1	3	14