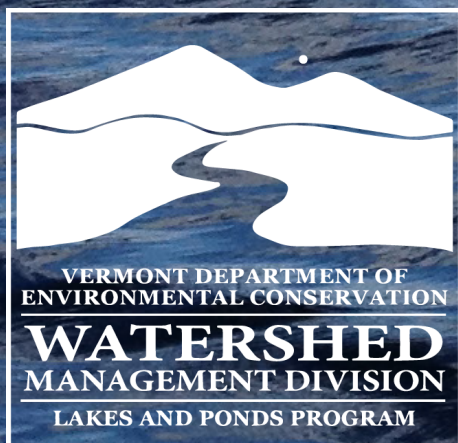


# Vermont Lay Monitoring Program 2014 Annual Report

*Lake Champlain & Inland Lakes*





# Vermont Lay Monitoring **Program** **2014 Annual** Report

Prepared by

**Bethany Sargent**  
**Environmental Scientist**

**AGENCY OF NATURAL RESOURCES  
DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
WATERSHED MANAGEMENT DIVISION  
LAKES AND PONDS PROGRAM**

**1 National Life Drive, Main 2  
Montpelier, VT 05620-3522  
(802) 828-1535  
[www.watershedmanagement.vt.gov](http://www.watershedmanagement.vt.gov)**

The Vermont Department of Environmental Conservation is an equal opportunity agency and offers all persons the benefits of participating in each of its programs and competing in all areas of employment regardless of race, color, religion, sex, national origin, age, disability, sexual preference, or other non-merit factors.

This document is available upon request in large print, braille or audio cassette.

VT Relay Service for the Hearing Impaired: (800) 253-0191 TDD>Voice - (800) 253-0195 Voice>TDD





## FROM THE COORDINATOR

2014 marked the Vermont Lay Monitoring Program's 36th season, and my 3rd season as coordinator. Lay Monitors donated nearly 750 hours of their time to make approximately 600 sampling trips, monitoring 12 Lake Champlain stations and 54 inland lakes (see Figure 22 for a map of sampling sites).

I feel so honored to work with so many dedicated volunteers, a number of whom have been active with the program for decades (please see Appendix B for a list of Distinguished Service Awards). In particular, I'd like to thank Dick Harter who has officially retired from the Lay Monitoring Program after 30 years of sampling on Lake Champlain, primarily at Button Bay, but also at Keeler Bay - we will certainly miss him!

I'd also like to thank Tina Centofante, who many of you got to know and adore as much as I did. For two summers in a row she drove Vermont's back roads, picking up samples, training new monitors, accompanying seasoned monitors on annual sampling visits, logging in samples at the lab, and entering data. Fortunately Tina has not gone far - she is the new Wetlands Ecologist, serving Chittenden County, with the Wetlands Program.

I owe an enormous amount of gratitude to Amy Picotte, who coordinated the Lay Monitoring Program for twenty years, wrapping up in 2011. Though she is now primarily focused on the Lake Wise Program, which awards lake-friendly shoreland property and provides technical support to shoreland property owners interested in reducing their impact on lake health, she continues to serve as the Lay Monitoring Program advisor and my mentor.

Last, but not least, thank you to Alison Farnworth, Megan Phillips, Dan McAvinney, and Dan Needham and the seasonal staff at the Department of Environmental Conservation Lab, who processed thousands of chlorophyll-a and total phosphorus samples last summer, providing the results that make this report so meaningful.



## TABLE OF CONTENTS

### Section 1

<b>Program History and Purpose.....</b>	<b>1</b>
<b>Water Quality Parameters.....</b>	<b>2</b>
<b>Sampling Procedures.....</b>	<b>5</b>
<b>The Relationship of Water Quality Parameters....</b>	<b>9</b>
<b>Lay Monitoring Data Analysis.....</b>	<b>12</b>
<b>Eutrophication and Trophic State.....</b>	<b>13</b>
<b>Use of LMP Data.....</b>	<b>18</b>

### Section 2

#### Lake and Station Reports

##### Lake Champlain

#4 - Button Bay - Broad Lake.....	21	#22 - Maquam Bay.....	33
#7 - Burlington Bay - Broad Lake...	23	#30 - Alburg Bridge.....	35
#9 - Colchester Shoals.....	25	#33 - Burlington Bay.....	37
#10 - Outer Malletts Bay.....	27	#38 - Town Farm Bay.....	39
#11 - Inner Malletts Bay.....	29	#40 - North Beach.....	41
#21 - Keeler Bay.....	31	#41 - Queneska Island....	43

##### Inland Lakes

Beebe.....	45	Great Hosmer.....	83	Perch.....	121
Big Pond.....	47	Green River.....	85	Raponda.....	123
Bomoseen....	49	Groton.....	87	Rescue.....	125
Carmi.....	51	Halls.....	89	Runnemedede.....	127
Caspian.....	53	Harveys.....	91	Salem.....	129
Chipman.....	55	Holland.....	93	St. Catherine.....	131
Cole.....	57	Indian Brook.....	95	St. Cat. - Little Lake....	133
Coles.....	59	Iroquois.....	97	Seymour.....	135
Curtis.....	61	Island.....	99	Shadow.....	137
Danby.....	63	Joes.....	101	Silver.....	139
Dunmore.....	65	Maidstone.....	103	South (Eden).....	141
East Long....	67	Miles.....	105	Sunrise (Orwll/Bnsn)...	143
Echo.....	69	Mirror.....	107	Ticklenaked.....	145
Eden.....	71	Morey.....	109	Valley.....	147
Elfin.....	73	Newark.....	111	Willoughby.....	149
Elmore.....	75	Nichols.....	113	Woodbury.....	151
Fairfield.....	77	North Montpelier....	115		
Fairlee.....	79	Parker.....	117		
Fosters.....	81	Peacham.....	119		

### Appendix

<b>A. LMP Participation - 1979-2014.....</b>	<b>153</b>
<b>B. Distinguished Service Awards.....</b>	<b>161</b>
<b>C. Lakes and Ponds Program Contacts.....</b>	<b>162</b>
<b>D. Glossary.....</b>	<b>164</b>

## FIGURES - SECTION 1

1. Number of inland lakes and Lake Champlain stations sampled under the LMP each year since 1979.....	1
2. Secchi disk.....	2
3. Algae under a microscope.....	3
4. Sources of phosphorus.....	4
5. LMP long-term summer means for Secchi water clarity - inland lakes.....	6
6. LMP long-term summer means for Secchi water clarity - Lake Champlain.....	7
7. LMP long-term summer means for chlorophyll-a - inland lakes.....	7
8. LMP long-term summer means for chlorophyll-a - Lake Champlain.....	7
9. LMP long-term summer means for total phosphorus - inland lakes.....	8
10. LMP long-term summer means for total phosphorus - Lake Champlain.....	8
11. Secchi water clarity versus chlorophyll-a - inland lakes.....	9
12. Secchi water clarity versus phosphorus - inland lakes.....	9
13. Chlorophyll-a versus phosphorus - inland lakes.....	10
14. Secchi water clarity versus chlorophyll-a - Lake Champlain.....	10
15. Secchi water clarity versus phosphorus - Lake Champlain.....	11
16. Chlorophyll-a versus phosphorus - Lake Champlain.....	11
17. Trophic states.....	13
18. Trophic state of LMP lakes.....	15
19. Oligotrophic lake graph.....	16
20. Mesotrophic lake graph.....	17
21. Eutrophic lake graph.....	17

## SECTION 1

### PROGRAM HISTORY AND PURPOSE

The Vermont Lay Monitoring Program is a citizen science program that trains and equips volunteers to conduct periodic water quality sampling of lakes. Since the program's inception in 1979, the principal goals have been to develop an accurate water quality database centered on nutrient enrichment and to inform lake residents and users about lake ecology and stewardship. Specifically, the program's objectives are to:

1. provide a perspective on the range of water quality conditions in Vermont lakes;
2. describe water quality conditions for each lake participating in the program;

3. provide data useful in developing statistical eutrophication models for Vermont lakes;
4. establish a database on each lake useful for documenting future changes in water quality; and
5. educate and engage lake residents and users in lake stewardship and protection.

The Lay Monitoring Program was started by the Vermont Department of Environmental Conservation (DEC) with an initial participation of 32 lakes and 19 Lake Champlain stations. Since then, participation has increased to include a total of 91 lakes and 40 Lake Champlain stations.

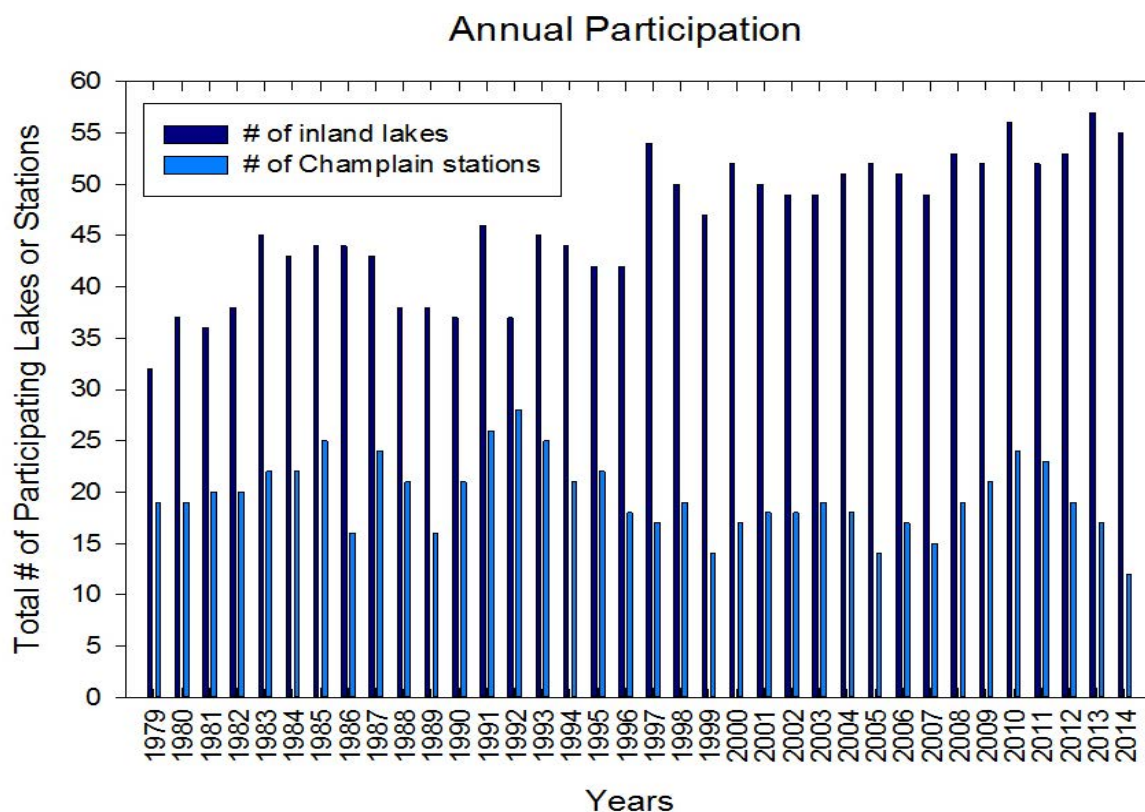


Figure 1. Number of inland lakes and Lake Champlain stations sampled under the LMP each year since 1979



## WATER QUALITY PARAMETERS

The Lay Monitoring Program is concerned with measuring water quality as it relates to increased nutrient enrichment of lakes. Nutrient enrichment caused by human activities is the primary threat to Vermont lake water quality.

A variety of conditions may occur in a lake with declining water quality due to excessive nutrient enrichment. Nutrients in the water stimulate algae and rooted plant growth and the lake's "productivity" increases. As a result, dense algae growth decreases water clarity and impacts human use and enjoyment of the water. Excessive aquatic plant growth can interfere with boating, swimming, fishing, and other recreational uses. As these plants and algae die each year, they fall to the bottom, adding nutrients and organic debris to lake sediments. When the natural environment of a lake is altered, the types of fish and other wildlife the lake supports may also change.

To determine a lake's water quality, or productivity, the Lay Monitoring Program measures Secchi transparency, and chlorophyll-a and total phosphorus concentrations.

### Water Quality: Secchi Transparency

The Secchi reading is a measure of the clarity of lake water, which is directly related to the amount of materials suspended in the water column. Particulate matter, such as algae or silt, limits light penetration and reduces the water's transparency (Figure 2).

Some Vermont lakes have naturally "tea" colored water. This is very common in beaver ponds and in acidic lakes in some areas of the state. The color is due to the

presence of dissolved organic acids, and can reduce the water's clarity. However, water color is not a major factor in most Lay Monitoring lakes. Other variables unrelated to nutrient enrichment can also influence the Secchi reading, such as wave action and light reflection. These two variables can be minimized by sampling on calm days and taking the Secchi reading from the shaded side of the boat.



Figure 2. Secchi disk  
(Photo credit: VTDEC)

On a few of the shallower Lay Monitoring inland lakes and Lake Champlain stations, the Secchi disk is still visible at the bottom of the lake. For example, if the Secchi disk is viewed to the bottom at a depth of 5 meters, this should be interpreted to mean the Secchi transparency is at least 5 meters. Such measurements are not an actual measure of water clarity (since the real reading would be deeper had the disk not met the bottom), and useful summer averages cannot be calculated.

The Secchi disk is widely used as a basic water quality indicator, and a Secchi

transparency reading can often be related to the nutrient enrichment of a lake or its trophic state. An oligotrophic (deep, cold water) lake usually has very clear water and therefore a deep Secchi reading. In contrast, a eutrophic (shallow, warmwater) lake usually supports large populations of algae and therefore has a shallow Secchi reading. (The relationship between Secchi transparency and chlorophyll-a, and Secchi transparency and total phosphorus is shown in Figures 11, 12, 14 and 15.)

### **Chlorophyll-a Concentration**

Algal populations in a lake can be quantified by measuring the amount of chlorophyll-a in a water sample. Chlorophyll-a is the photosynthetic green pigment contained in all types of algae and other green plants. The amount of chlorophyll-a present in a water sample is directly proportional to the amount of algae living in the water. In the course of a year, algal populations typically follow a classic successional pattern from a peak population of diatoms (a group of algae which use silica to form glass shells for support and protection) in early spring to a variable summer algal population to a peak population of blue-green algae in the fall. The magnitude of the populations and the diversity of the species composition depend on factors such as the degree of nutrient enrichment in the lake and prevailing weather conditions.



Figure 3. Algae under a microscope  
(Photo credit: VTDEC)

Theoretically, if the Secchi reading is related to the amount of particulate matter suspended in the water, it should also be related to the water's chlorophyll-a concentration. If all other factors are constant, as algal populations and chlorophyll-a concentrations increase, Secchi transparency should decrease. However, this relationship does not always hold true because Secchi transparency is influenced by multiple factors and algal populations often inhabit water levels below the Secchi disk depth, which would cause higher chlorophyll-a concentrations without affecting Secchi depth.

The chlorophyll-a concentration can often be related to the trophic state of a lake. An oligotrophic lake usually supports a small algal population and therefore has a low chlorophyll-a concentration. Conversely, a eutrophic lake usually supports large algal populations and therefore has a high chlorophyll-a concentration. (The relationship between chlorophyll-a and Secchi transparency, and chlorophyll-a and total phosphorus is shown and explained in Figures 11, 13, 14 and 16.)

### **Total Phosphorus Concentration**

Phosphorus is the nutrient in shortest supply in Vermont lakes, therefore it is the one most likely to stimulate productivity, and the best nutrient to measure to track changes in productivity and is therefore an important indicator of water quality. Total phosphorus includes all the different chemical forms of phosphorus, and is an indication of the amount of phosphorus potentially available for algal growth.

Phosphorus enters a lake from a variety of natural and cultural sources, including rainfall, incoming streams, land runoff, ground water, and direct discharges. Phosphorus is contributed

naturally to aquatic environments by the decomposition of organic matter and the erosion of phosphorus-containing soils. Culturally, phosphorus is contributed to a lake system by people's activities in the drainage basin (Figure 4). Within a lake, phosphorus that has accumulated in the bottom sediments may become re-suspended in the water under anaerobic (no oxygen) conditions.

Under natural conditions, the majority of phosphorus inputs to a lake occur during the spring when the flow of inlet streams is high due to snowmelt and spring rains. Cultural nutrient inputs, on the other hand, may occur at any time of the year. While the lake is in spring overturn, just after ice-out, the incoming phosphorus is distributed evenly throughout the lake. At this time, the total phosphorus concentration in a lake can be used to predict the amount of algal growth that will occur in the lake

during the summer. Total phosphorus concentrations measured during the summer, on the other hand, reflect the amount of phosphorus contained in algae in the water, as well as the amount of phosphorus which is still available to the algae. Thus, spring total phosphorus concentration is related to the potential algal growth which will occur in a given season, while summer total phosphorus concentration is related to the algal growth occurring on a given sampling day, as well as the potential for future algal growth.

Theoretically, total phosphorus concentration should be directly related to chlorophyll-a concentration and indirectly related to Secchi disk transparency. Hence, total phosphorus concentration is related to the trophic state of a lake. An oligotrophic lake usually receives small amounts of total phosphorus in the spring and exhibits low total phosphorus

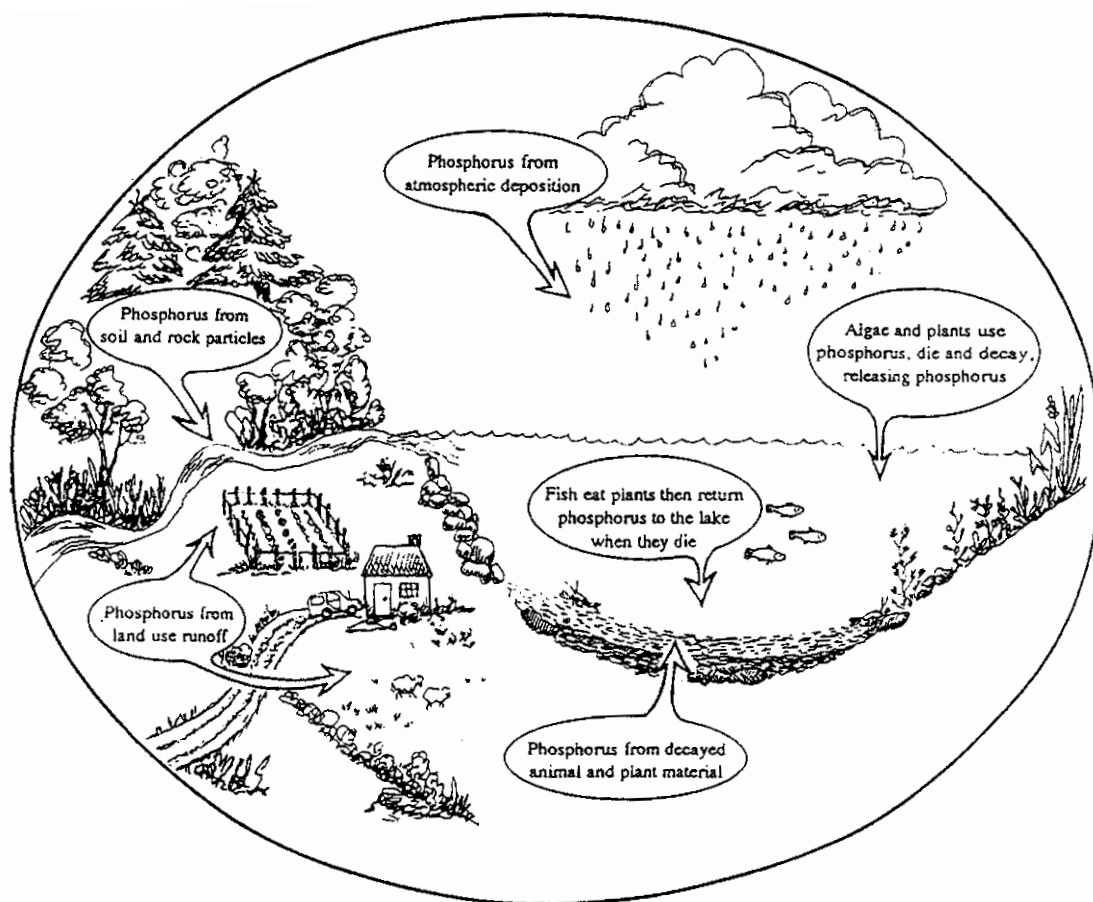


Figure 4. Sources of phosphorus

concentrations throughout the summer. In contrast, a eutrophic lake usually receives large quantities of total phosphorus in the spring and exhibits high total phosphorus concentrations throughout the summer. (The relationship between total phosphorus and Secchi transparency, and total phosphorus and chlorophyll-a is shown in Figures 12, 13, 15, and 16.)

Although spring total phosphorus is sampled every few years on many Lay Monitoring lakes, it is not collected from Lake Champlain. Summer total phosphorus is measured on Lake Champlain, as the phosphorus distribution in such a large lake is a dynamic system, which cannot be measured by sampling only during spring overturn. The dynamic system in Lake Champlain is a result of the constant redistribution of phosphorus via currents and mixing patterns in the lake, internal loading as phosphorus in the sediment becomes resuspended, and continual phosphorus inputs via the lake's tributaries and, to a lesser extent, point source discharges such as sewage treatment plants.

## SAMPLING PROCEDURES

Each Lake Champlain Lay Monitor samples one station, while inland lake Lay Monitors typically sample two stations. For Lake Champlain, station locations are chosen to be most representative of the water quality of the bay (e.g. Town Farm Bay) or region (e.g. Main Lake). For inland lakes, station 1, where water samples are collected for total phosphorus and chlorophyll-a in addition to measuring Secchi water clarity, is located in the main part of the lake and is representative of the lake's overall water quality conditions. Station 2 is typically located near the outlet of a lake or pond. Only Secchi transparency is measured at station 2.

A small number of lakes and Lake Champlain stations are monitored for Secchi transparency only.

Lay Monitors sample every five to ten days from Memorial Day through Labor Day (the earliest start date for sampling is May 15th and the latest end date is September 15th). A minimum of eight samples is needed to calculate a summer annual average.

## Secchi Transparency

Water clarity is measured using a Secchi disk, a metal disk painted with two black and two white quadrants. The Secchi disk is lowered slowly into the water and the lowest depth at which it is still visible is the Secchi transparency reading. Measurements are read in meters (1 meter = 3.28 feet) from a marked line attached to the center of the disk.

## Algal Population Density (Chlorophyll-a Concentration) and Nutrient Enrichment (Total Phosphorus Concentration)

Water samples are collected (in duplicate) by using a weighted hose, measured in meters along its length. The hose is lowered straight down into the water to a depth twice the Secchi reading. In this way a composite sample of the water column from the water's surface to the depth of the hose is contained within the hose. The hose is crimped shut at the water's surface and pulled up by reeling in a rope attached to the lower weighted end. When the weighted end is brought into the boat, the crimp is released and the water is emptied into a bucket. From the bucket, the water is poured into a bottle and the hose is lowered once again to collect the duplicate sample.

Upon returning to shore, the monitor sets



up a “home laboratory.” From the 500 milliliter (ml) bottle, 50 ml are poured into a glass test tube, which is labeled and stored on a shelf away from bright light. Next, 100 ml of the sample water are filtered through a simple filtration unit. The algae, and therefore the chlorophyll-a contained in the algae, are retained on the filter. The filter is folded, labeled, and frozen.

Chlorophyll-a samples are taken in duplicate; total phosphorus samples are not. Every two weeks the chlorophyll-a filters and phosphorus test tubes are picked up by Lay Monitoring Program Staff and transported to the DEC Laboratory in Burlington for analysis.

Chlorophyll-a concentration is analyzed using fluorimetric determination. Total phosphorus is analyzed by the colorimetric, automated ascorbic acid method.

## Secchi Water Clarity, Chlorophyll-a, and Total Phosphorus Long-Term Means

The following graphs show the long-term summer means for inland lakes and Lake Champlain stations that participated in the LMP in 2014. Annual summer means are calculated from at least eight samples. Long-term means are based on averaging all the annual summer means. Some lakes or stations have been sampled since 1979 when the LMP first started. The lakes (or stations) are ranked in order of increasing Secchi disk transparency, Chlorophyll-a concentration, or total phosphorus concentration with the lakes (or stations) with the lowest clarity or concentration on the left side of the graph and those with the greatest clarity or highest concentration on the right side. The groups of low, moderate, and high are based on the range of clarity readings recorded in Vermont over the last 30 years.

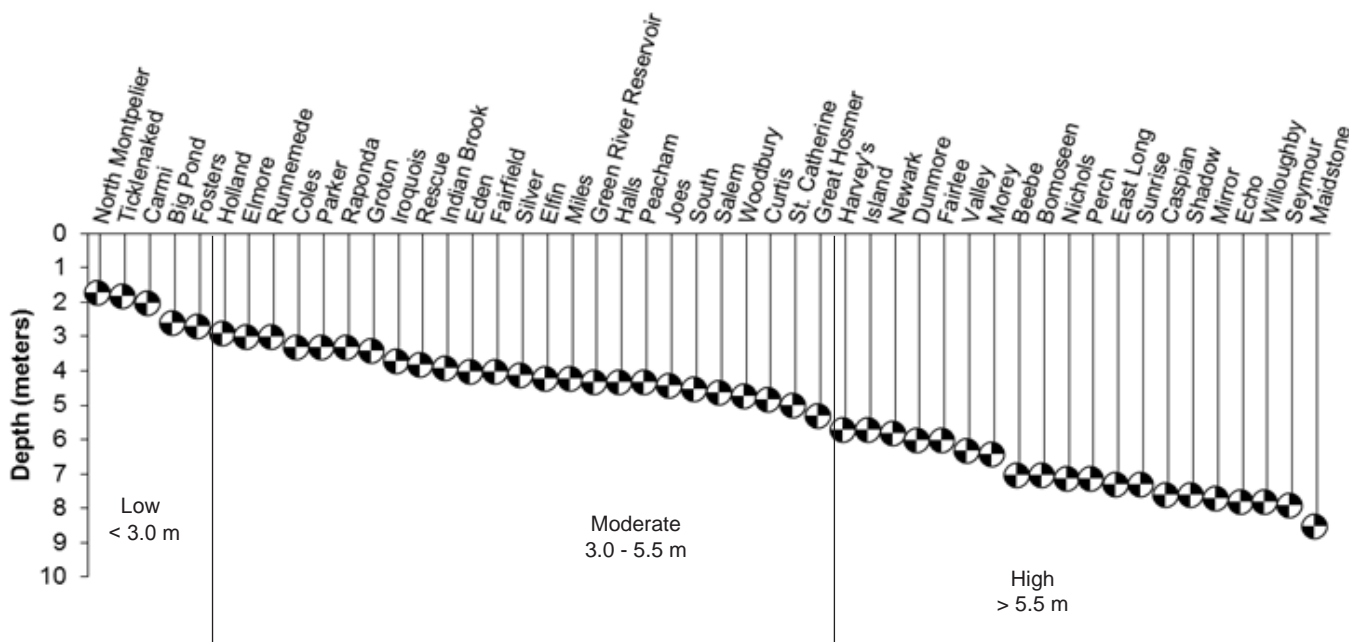


Figure 5. LMP long-term summer means for Secchi water clarity - inland lakes

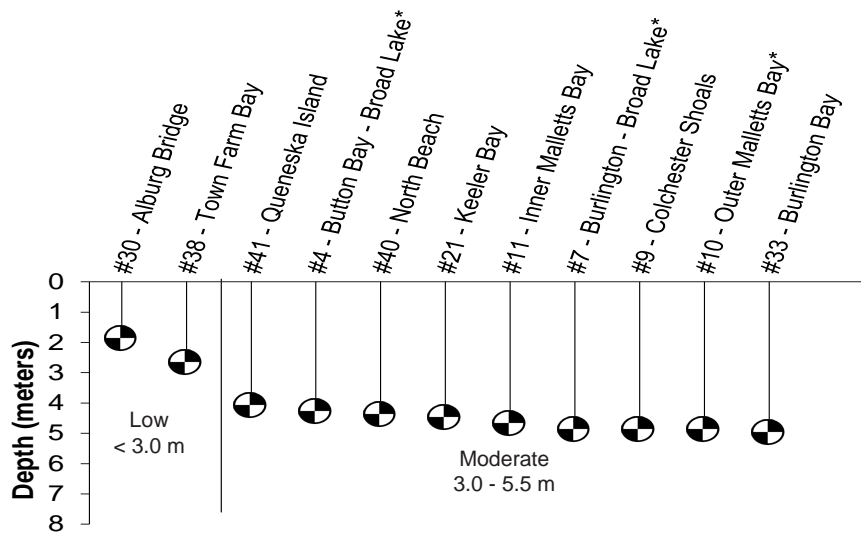


Figure 6. LMP long-term summer means for Secchi water clarity - Lake Champlain

\* Sampled for Secchi transparency only in 2015.

Figure 7. (below) LMP long-term summer means for chlorophyll-a - inland lakes

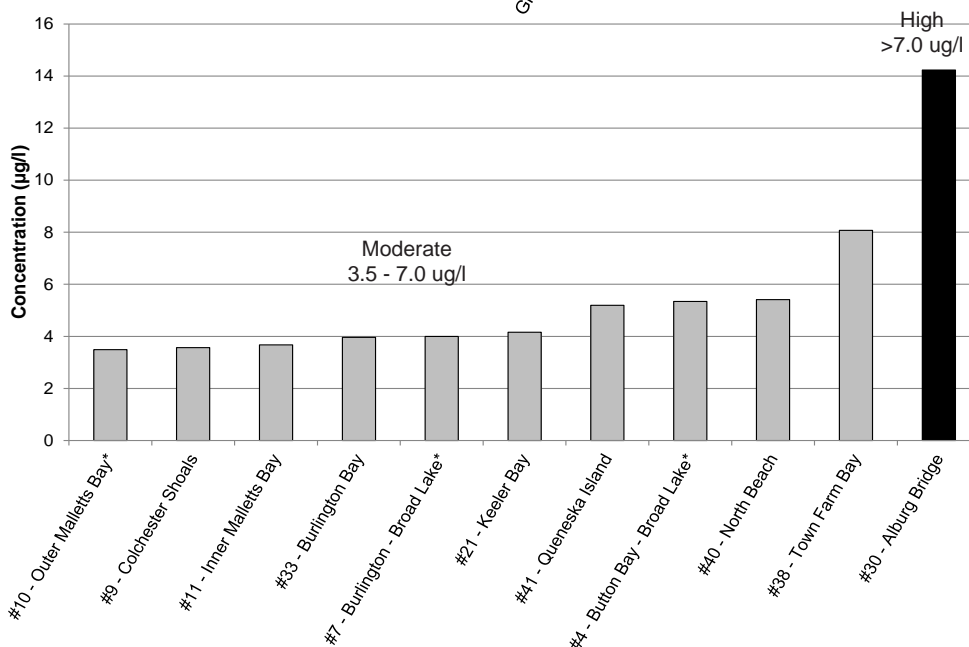
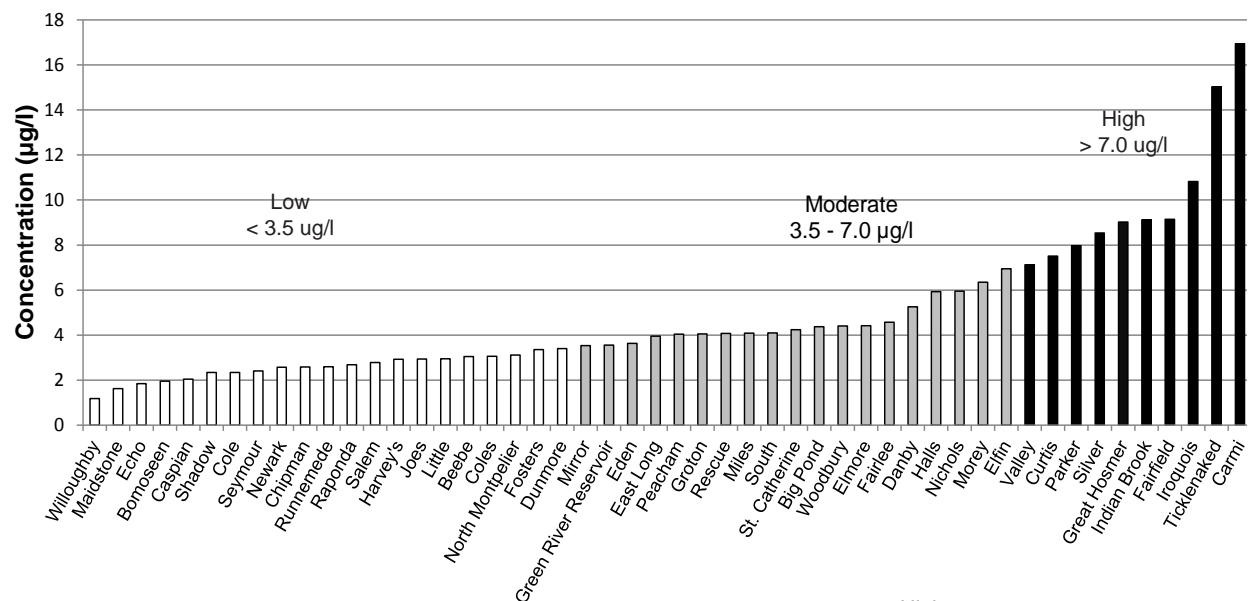


Figure 8. LMP long-term summer means for chlorophyll-a - Lake Champlain

\* Sampled for Secchi transparency only in 2015.

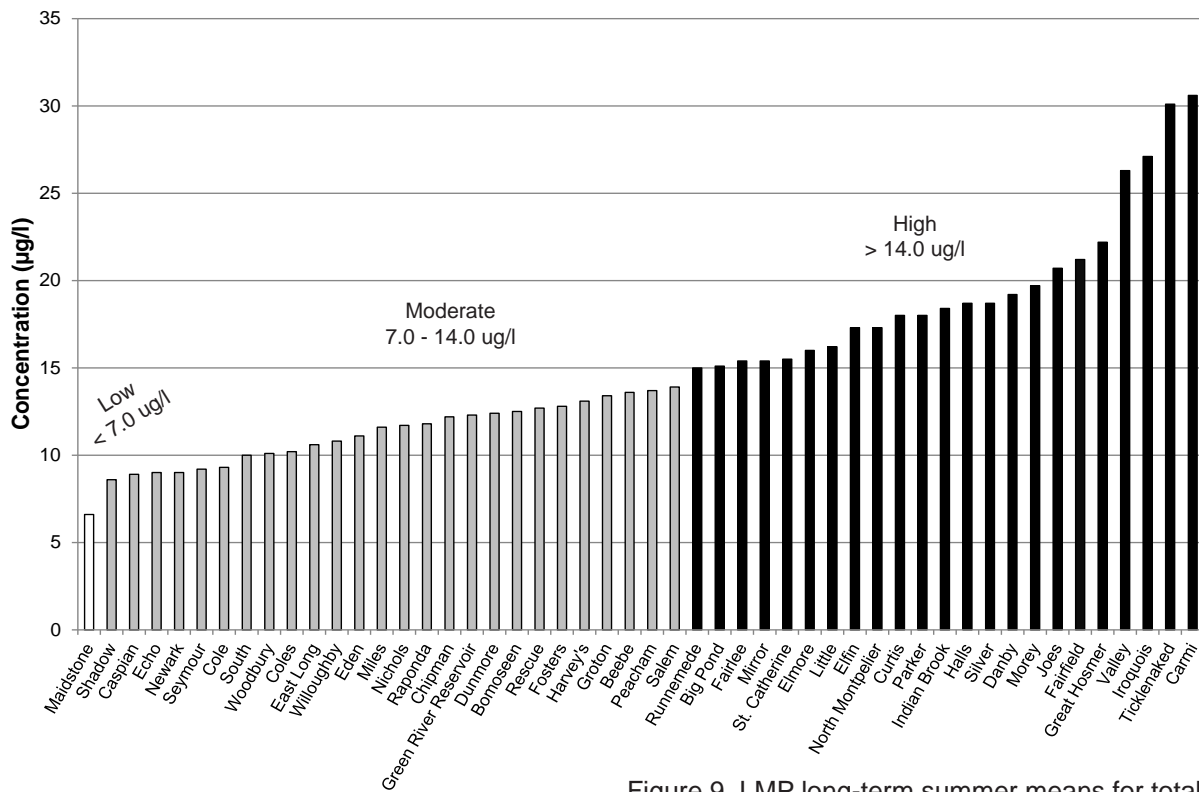
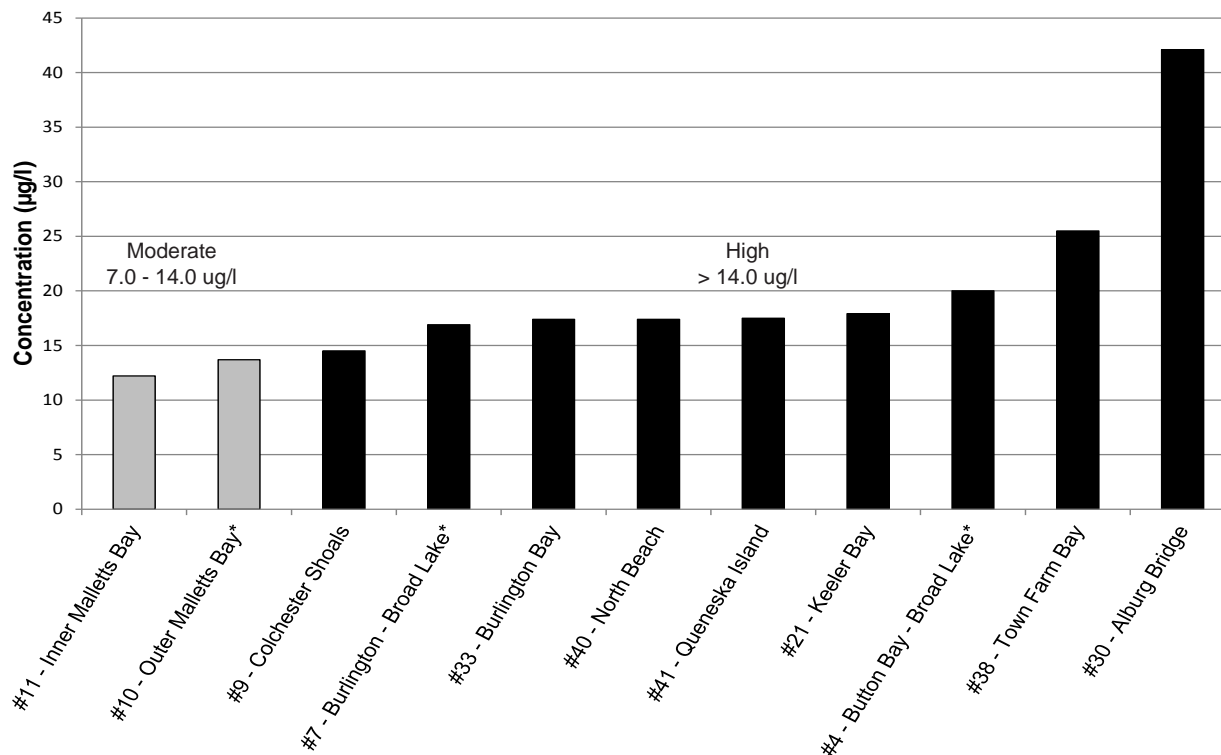


Figure 9. LMP long-term summer means for total phosphorus - inland lakes



\* Sampled for Secchi transparency only in 2015.

Figure 10. LMP long-term summer means for total phosphorus - Lake Champlain

## THE RELATIONSHIP OF WATER QUALITY PARAMETERS

Figures 11 - 16 present the relationships of the inland lake and Lake Champlain long-term data. The parameters sampled, Secchi disk transparency, chlorophyll-a, and total phosphorus, are graphed against each other in order to observe how they are related to, and affected by, each other. Using the lake station data, three graphs were created for inland lakes and three for Lake Champlain stations: Secchi water clarity versus chlorophyll-a concentration; Secchi water clarity versus total phosphorus; and chlorophyll-a concentration versus total phosphorus.

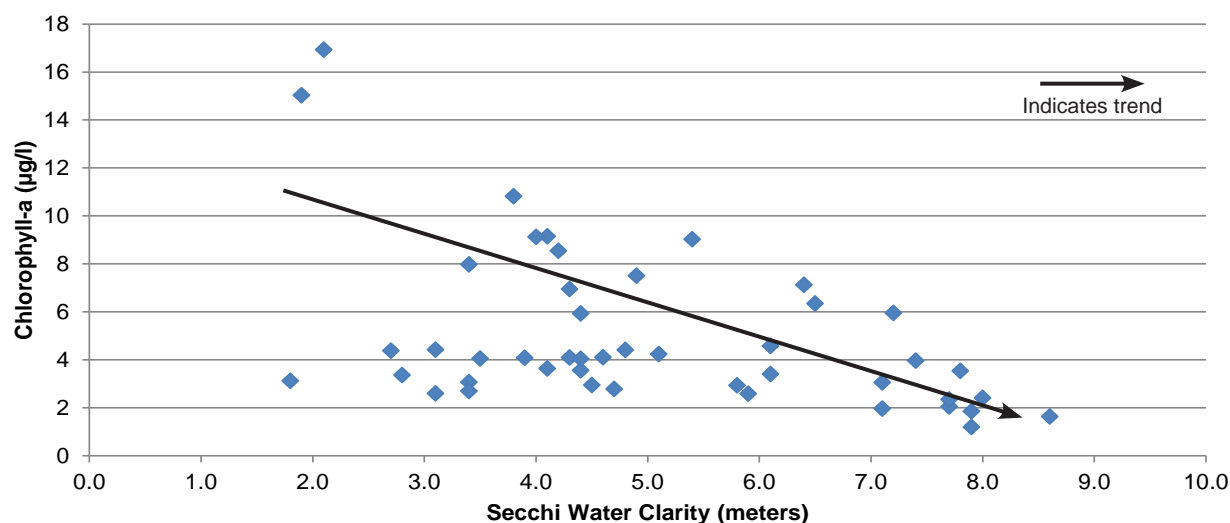


Figure 11. shows the relationship between Secchi water clarity and chlorophyll-a concentration, using the long-term summer inland lake means. Each data point represents the Secchi/chlorophyll-a relationship for one lake. In general this graph shows that when Secchi water clarity increases, chlorophyll-a concentration decreases.

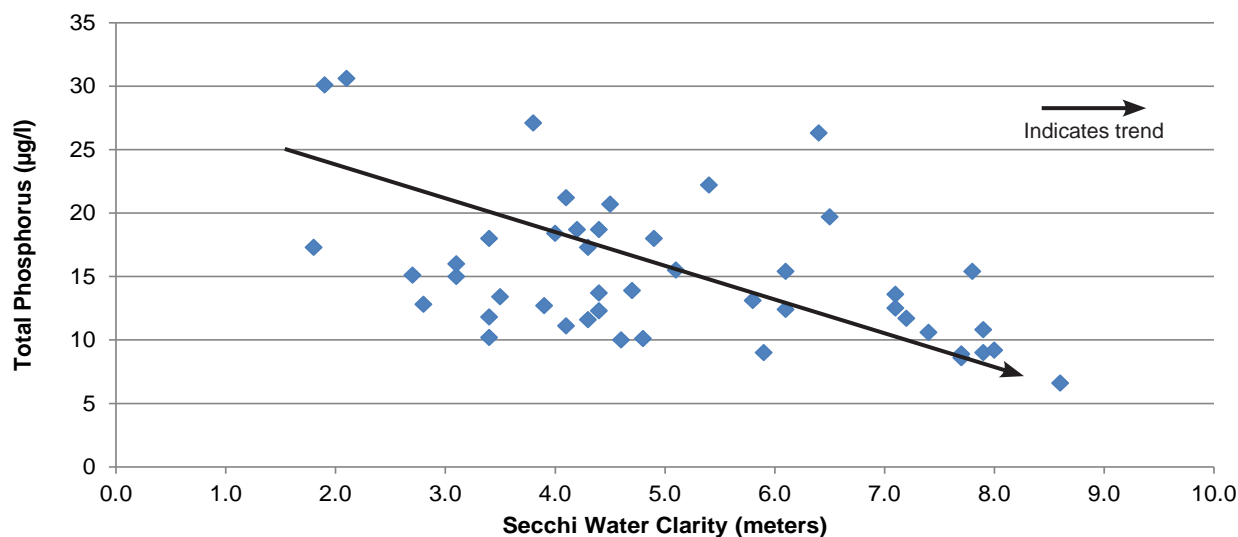


Figure 12. shows the relationship between Secchi water clarity and total phosphorus concentration using the long-term summer inland lake means. Each data point represents the Secchi/total phosphorus relationship for one lake. In general this graph shows that as Secchi water clarity increases, the total phosphorus concentration decreases.



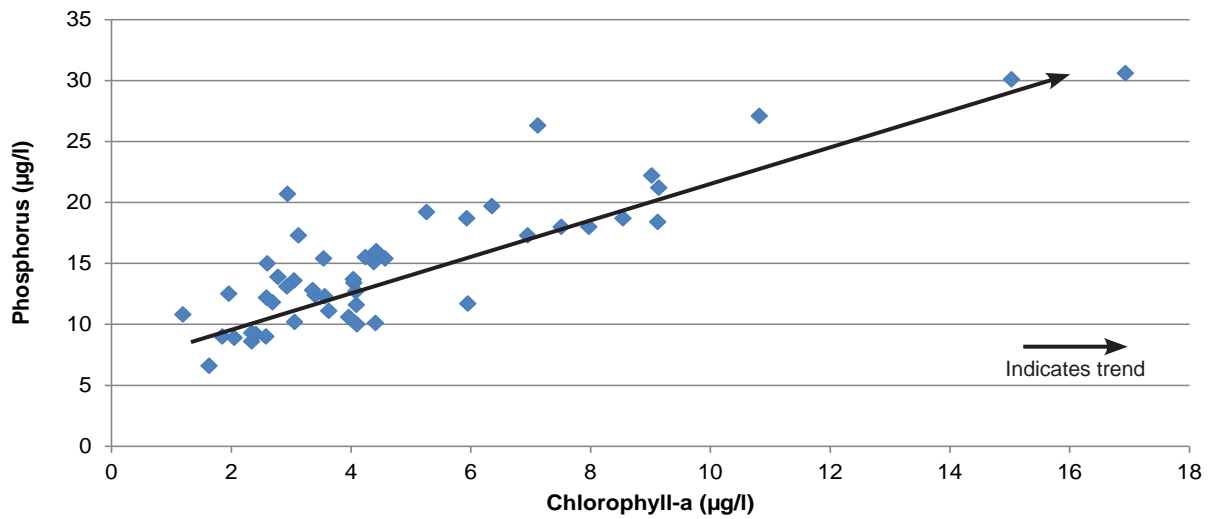


Figure 13. shows the relationship between chlorophyll-a and total phosphorus concentration using the long-term summer inland lake means. Each data point represents the chlorophyll-a/ total phosphorus relationship for one lake. In general this graph shows that as total phosphorus concentration increases, the chlorophyll-a concentration also increases.

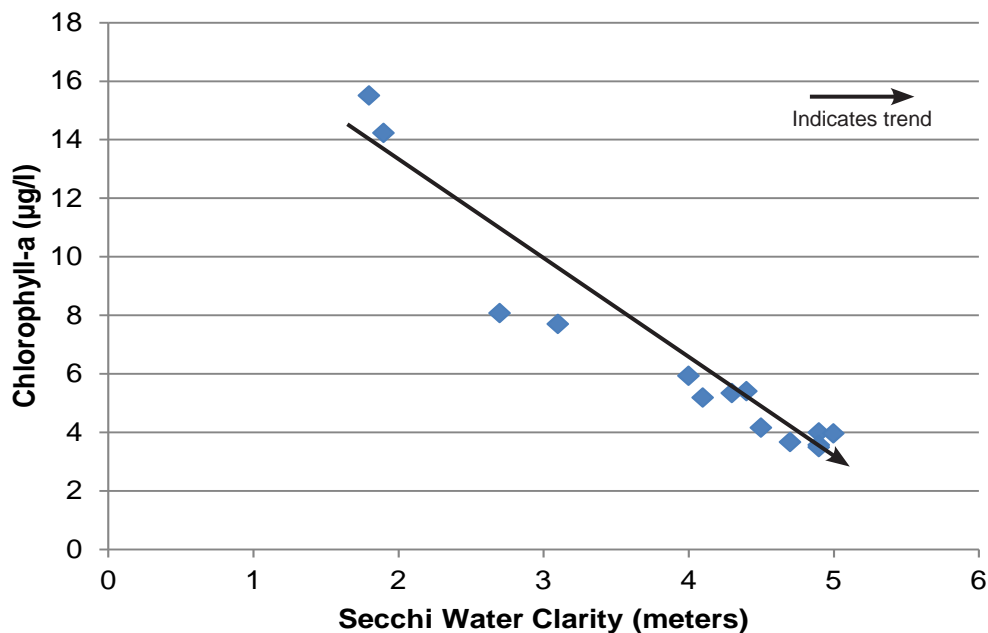


Figure 14. shows the relationship between Secchi water clarity and chlorophyll-a concentration using the long-term summer means for Lake Champlain stations. Each data point represents the Secchi/chlorophyll-a relationship for one Lake Champlain station. In general this graph shows that as Secchi water clarity increases, the chlorophyll-a concentration decreases.

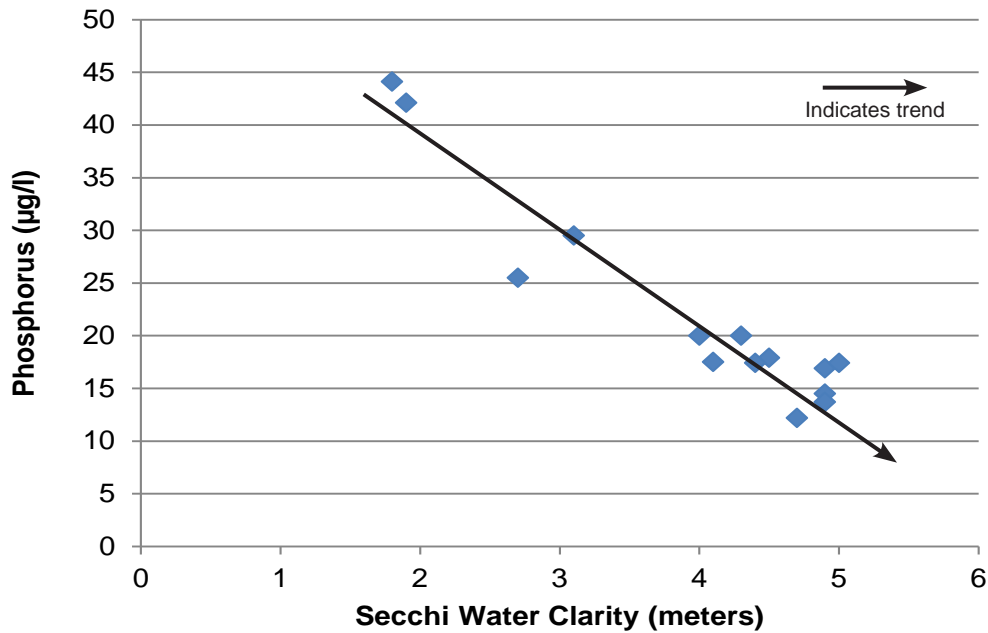


Figure 15. shows the relationship between Secchi water clarity and total phosphorus concentration using the long-term summer means for Lake Champlain stations. Each data point represents the Secchi/total phosphorus relationship for one Lake Champlain station. In general this graph shows that as Secchi water clarity increases, the total phosphorus concentration decreases.

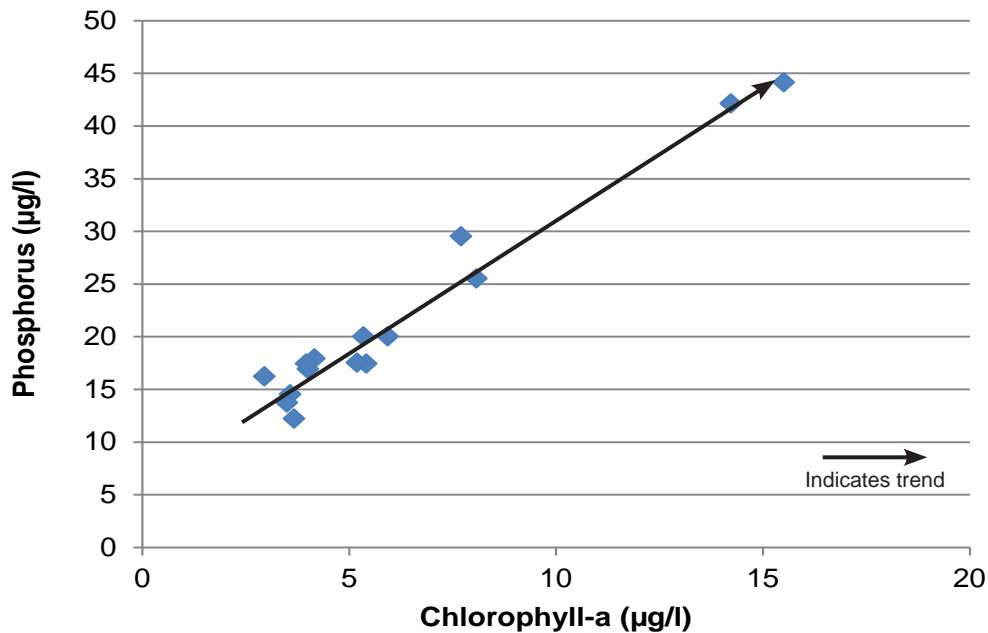


Figure 16. shows the relationship between chlorophyll-a and total phosphorus concentration using the long-term summer means for Lake Champlain stations. Each data point represents the chlorophyll-a/total phosphorus relationship for one Lake Champlain station. In general this graph shows that as chlorophyll-a concentration increases, the total phosphorus concentration also increases.

## LAY MONITORING DATA ANALYSIS

A data analysis is conducted on all of the Lay Monitoring lakes and Lake Champlain stations. This analysis consists of:

1. calculating the summer annual means for each parameter sampled;
2. showing and comparing the long-term means for the inland lakes and Lake Champlain stations;
3. designating the trophic state (eutrophic, mesotrophic, and oligotrophic) of each lake based on the long-term means for each parameter sampled; and
4. determining trends from water quality databases. A database should describe water quality conditions with enough accuracy to be useful in statistical analyses.

### Summer Annual Means

The reliability of summer annual means for each water quality parameter depends on the sampling technique of the monitors and the frequency of the sampling. A summer average calculated from many samples will be more reliable and representative of the lake than an average determined from just a few samples. Summer averages based on sparse, inconsistent, or scattered sampling are considered weak and are not truly comparable with other lakes or with other years. If a lake was sampled seven weeks or less during the summer its summer average Secchi disk transparency, chlorophyll-a concentration, and total phosphorus concentration are not calculated and will not appear in the individual lake Annual Data Tables as such. Since partial data sets may contain useful information, a record of which years each lake or station was sampled is included in Appendix A.

For this report, spring total phosphorus means were calculated from station 1 only. For prior reports, they may have been calculated from multiple stations.

### Comparison of Long-Term Means Among Lakes

The comparison between lakes or stations based on the long-term water quality means is presented on pages 6-8. The graphs show the Lay Monitoring lakes and the Lake Champlain stations according to long-term means for each of the parameters sampled. The stations and lakes are grouped, for purposes of comparison among themselves, into three general divisions: high, moderate, and low. The stations or lakes falling within the same division may be considered to have a similar degree of nutrient enrichment.

### Determining Trends from Water Quality Databases

In addition to describing current water quality conditions on lakes, the Lay Monitoring data is useful for detecting future changes in water quality. Results from the first several years of a study are generally described as “base line” data and serve as a reference point for future studies. After base line conditions have been established, a change in water quality may be documented by demonstrating that a statistically significant difference is present between the recent data and the established base line conditions. In this way, if there is a water quality decline, it may be detected and lake residents can be alerted to take corrective action.

Data analysis is also useful for detecting long-term trends in water quality. Trends can show whether or not a lake’s water quality is changing or maintaining stable conditions.

All lakes exhibit natural variability from year to year, some more than others. The less variable the data on a particular lake, the faster it is to detect a trend. Likewise, the more variable a lake is, the longer it takes to see a trend. There are lakes in the program whose water quality is so variable that even 10 years of data is difficult to conclude much other than the water is highly variable from year to year.

The Lay Monitoring data reveal that, overall, Secchi disk transparency exhibits the least variability from year to year and thus is the best parameter for creating a database. The other parameters, chlorophyll-a and phosphorus concentrations, are often more variable and require more years of sampling to establish good reference points. However, the Lay Monitoring data on these lakes are still useful for describing current water quality conditions and for developing statewide eutrophication models.

The Lake Score Card, accessible on the Lakes and Ponds Program website at [http://www.watershedmanagement.vt.gov/lakes/html/lp\\_lakescorecard.htm](http://www.watershedmanagement.vt.gov/lakes/html/lp_lakescorecard.htm), conveys the large amount of data gathered through Lakes and Ponds Program's monitoring efforts. The Score Card answers the commonly asked question "how is my lake doing?" Monitoring data is analyzed and reported out in a simple, visual interactive format.

Water quality scores are derived from a statistical trend analysis of phosphorus, chlorophyll-a, and Secchi depth data over time. Stable or improving trends are scored with a blue or good rating, declining trends are scored with a yellow or fair rating, and highly significantly declining trends receive a red or reduced score. Lake Score Card trends are updated every five years.

## EUTROPHICATION AND TROPHIC STATE

Eutrophication is a temporal phenomenon that occurs over a span of thousands of years. Limnologists have divided the gradual process of eutrophication into various stages of nutrient enrichment called trophic states. Generally, eutrophication is divided into three broad states: oligotrophic, mesotrophic, and eutrophic. It is normal for all lakes to pass through these three states - from oligotrophy through mesotrophy to eutrophy. The rate at which a lake eutrophies depends on the size and shape of the lake and the characteristics of its drainage basin.

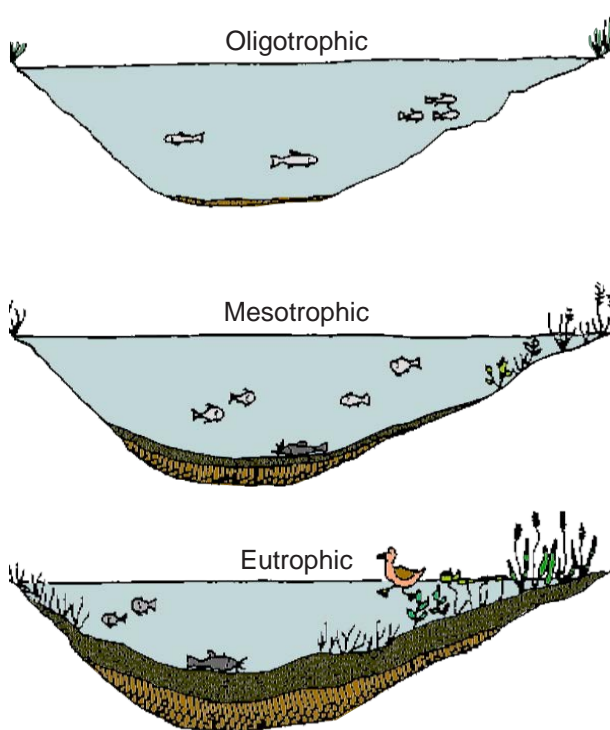


Figure 17. Trophic states

Vermont lakes are at many different stages in the process of eutrophication. Some are still deep, cold, and relatively unproductive (oligotrophic), while others



have filled in with sediment over the years to the point where they are now shallow and warm, and support substantial growths of rooted aquatic plants and/or algae (eutrophic).

Vermont is fortunate to have a diversity of lake types within its state boundaries with lakes that vary widely in terms of their individual progression in the eutrophication process, as each stage of eutrophication plays an important role in the natural environment.

To place a value judgment on a trophic state, for instance to call an oligotrophic lake “desirable” or a eutrophic lake “undesirable,” is not scientifically sound. The eutrophication process occurs naturally, and therefore should not suggest a value judgment. However, when people accelerate the eutrophication process through their activities in a lake’s watershed, they are altering the course of nature. When people alter the natural scheme of things, their impact may be considered detrimental. Thus, culturally accelerated eutrophication may be considered “undesirable.”

All lakes experience natural eutrophication and many lakes are exposed to cultural eutrophication. The extent of cultural eutrophication in a lake will depend on the variety and the management of land uses in the watershed and along the shoreline. The effect of cultural eutrophication is a rapid increase in the nutrient enrichment of a lake and an acceleration of the eutrophication process. Cultural eutrophication can be identified by conducting a study to determine the sources of nutrient loading to a lake (nutrients contributed by people cause cultural eutrophication), or by monitoring the rate of eutrophication of a lake (a rapid rate implies culturally accelerated eutrophication).

The water quality parameters commonly measured to determine the trophic state of a lake are Secchi disk transparency, chlorophyll-a concentration, and total phosphorus concentration. By examining the summer averages of these parameters, the trophic state or degree of nutrient enrichment can be assessed. A rapid rate of nutrient enrichment may be indicative of cultural eutrophication, as opposed to the slow rate of natural eutrophication.

## Trophic State

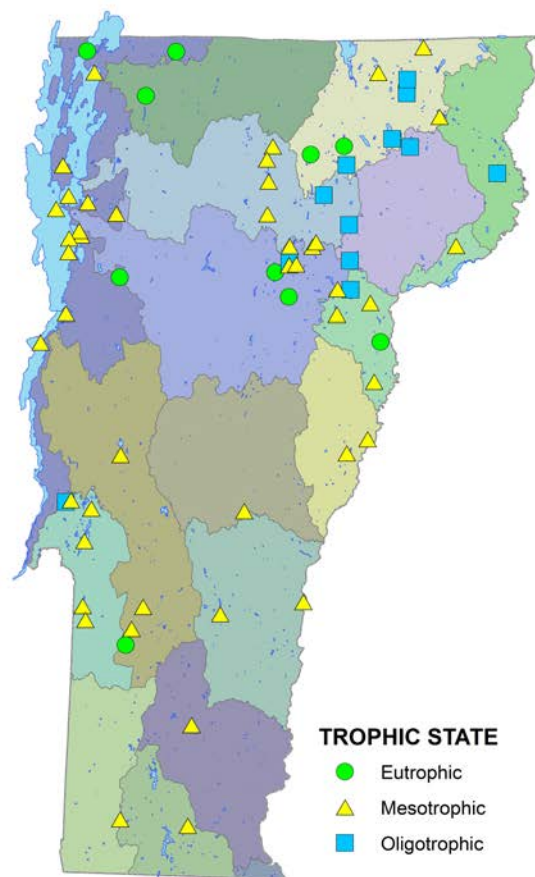
Each Lay Monitoring inland lake is evaluated to determine its trophic state based on the water quality data collected since the lake entered the Lay Monitoring Program. The three trophic categories used are: oligotrophic, mesotrophic, and eutrophic. To determine the trophic state, the available yearly averages since 1979 are averaged together for each parameter and the resulting values are compared with the table below. For instance, if a lake was sampled for three years, the three summer average Secchi disk transparencies, and chlorophyll-a and total phosphorus concentrations obtained during that time are averaged together. These average values define the trophic state according to the following Secchi disk transparency, chlorophyll-a concentration, and phosphorus concentration groupings:

Trophic State	Average Secchi Transparency	Average Chl-a Concentration	Average TP Concentration
Eutrophic	< 3 meters	> 7.0 ug/l	> 14 ug/l
Mesotrophic	3 - 5.5 meters	3.5 - 7 ug/l	7 - 14 ug/l
Oligotrophic	> 5.5 meters	< 3.5 ug/l	<7 ug/l

Due to the variability encountered within lakes, the average values of different parameters often do not fall neatly into the same trophic state. In these cases, to determine trophic state, the average spring phosphorus concentration is weighted most heavily, then chlorophyll-a concentration, and finally Secchi disk transparency. Some subjectivity is necessarily involved here, although an attempt is made to keep the evaluations of trophic state as objective as possible.

The Lay Monitoring lakes and stations are mapped on at right according to trophic state (Figure 18 at right). Lakes which are intermediate between trophic states are termed “transitional.” It is interesting to note that many of the oligotrophic lakes occur in northeastern Vermont, while most of the eutrophic lakes occur in lower elevation areas such as the Lake Champlain valley and the Connecticut River valley. Associated factors that might have influenced the trophic state of these lakes are naturally more productive soils in the valley areas and a longer history of human settlement and cleared land in these regions.

Figure 18. Trophic state of LMP lakes



The trophic state of each lake is included in the individual lake evaluations in Section 2 of this report.

### ***Oligotrophic***

Graphed below is a typical oligotrophic lake. Oligotrophic lakes are characterized by small algal populations and very clear water all summer. Notice the chlorophyll-a concentration remains low (between 1.0 and 2.0 ug/l) all summer. Likewise, the Secchi disk reading is consistently deep all summer (between 7.5 and 12 meters). Variations in the Secchi disk readings are probably caused by such factors as wind conditions during sampling and length of time since the last storm, rather than variations in algal population density.

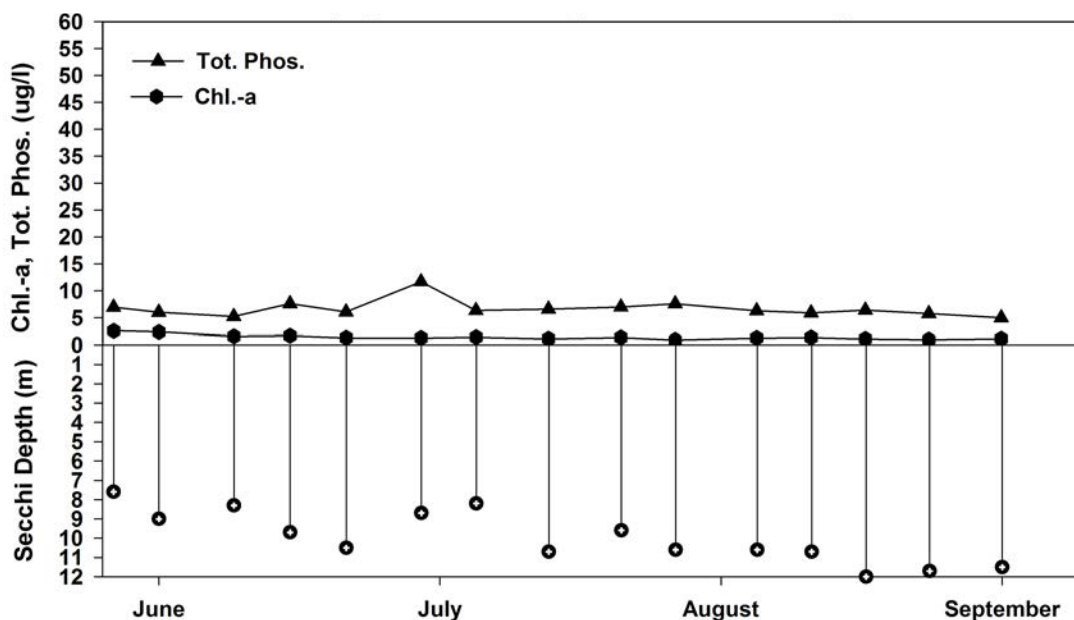


Figure 19. Oligotrophic lake graph

### ***Mesotrophic***

The following graph is a typical mesotrophic lake. Mesotrophic lakes are characterized by moderate algal populations and relatively clear water. Water clarity generally decreases during the summer as seen by the slow drop in Secchi disk transparency. Readings can vary anywhere from 3.0 to 5.5 meters. The algal population increases slowly during the summer as the water warms up and conditions become more favorable for growth. Chlorophyll-a concentrations usually vary between 3.5 and 7.0 ug/l. The shallowest Secchi disk reading often corresponds to the greatest chlorophyll-a concentration. However, due primarily to variations in sampling conditions, this is not always the case. Variations in Secchi disk readings on mesotrophic lakes are due to changes in the algal population density, the amount of sediment suspended in the water, and sampling day weather conditions.

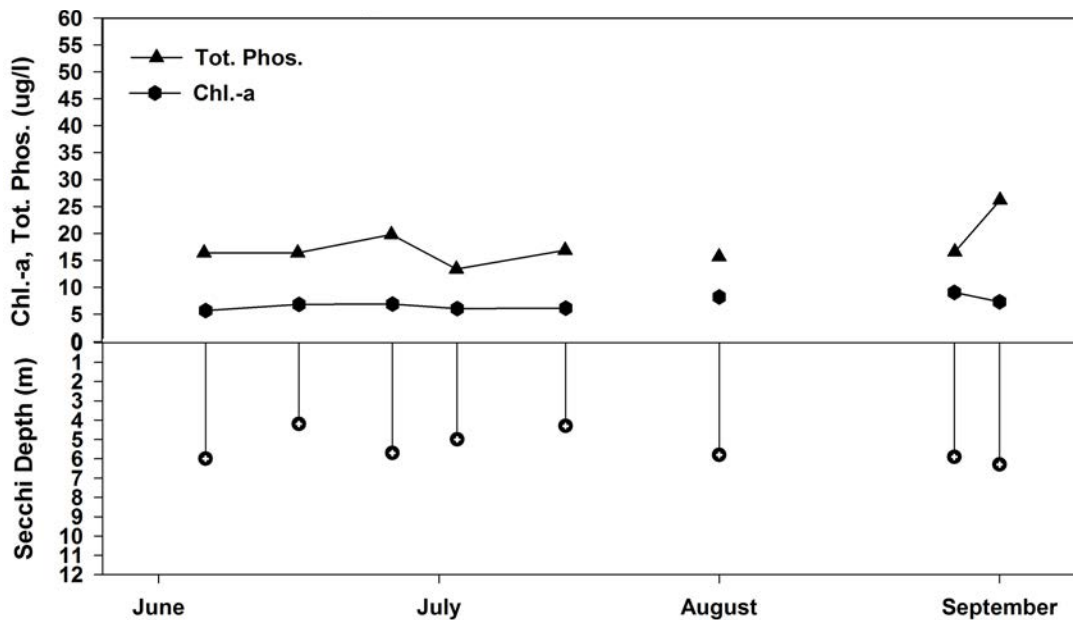


Figure 20. Mesotrophic lake graph

### Eutrophic

Graphed below is a typical eutrophic lake. Eutrophic lakes are characterized by shallow Secchi disk readings and large algal populations during most of the summer. By early June the lake already supports an abundant algal population. Water clarity is often between 2.0 and 3.5 meters during the summer, although it may drop below this during an algae “bloom.” When water and weather conditions become optimum for algae growth, one species population growth can increase dramatically. An algae bloom is not uncommon for a eutrophic lake during either July or August. Chlorophyll-a concentrations during blooms may be anywhere from 10 to 100 ug/l. Notice that the Secchi disk reading drops considerably during an algae bloom. Many lakes are naturally eutrophic; this does not mean these lakes have “poor” water quality.

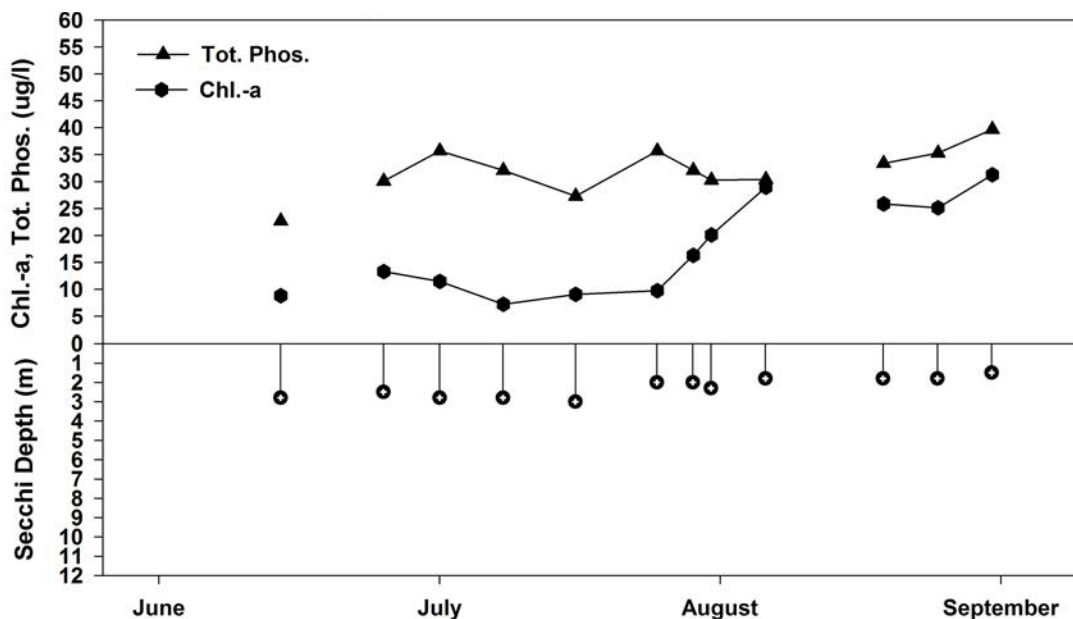


Figure 21. Eutrophic lake graph

## USE OF LMP DATA

Data from the Lay Monitoring Program show that lakes exhibit natural fluctuations in nutrient concentration from year to year. However, monitoring results can be used to detect significant, rapid, or smaller long-term increases in nutrient loading, which would most likely indicate cultural eutrophication. Lay Monitoring information helps to identify the changes in nutrient loading and alerts communities and lake residents to take corrective actions to prevent problems with their lake water quality.

- ***Determining Water Quality Trends***

Lay Monitoring data are used to establish the baseline conditions of a waterbody, and to identify water quality improvement or degradation over time. Lay Monitoring data are included in calculating water quality trends through the Lake Score Card.

- ***Water Quality Assessments***

Lay Monitoring data have been used to develop water quality assessments for Vermont's biennial "305(b) Report" to the U.S. Congress, named after the section of the Clean Water Act that requires the report. Data used for this purpose are evaluated in accordance with Vermont's Water Quality Assessment and Listing Methodology.

- ***Impaired and Priority Waters Listings***

Following the development of water quality assessments, certain waters are "listed" based on the available data, which can include Lay Monitoring data. The federal Clean Water Act requires states to prepare a biennial list of waters that do not meet Water Quality Standards due to pollutants. This list of impaired (polluted) waters is called the "303(d) list," after the section of the Clean Water Act that requires the list.

Vermont also prepares a list of waters that are state priorities for further study or remediation that do not fall within the limited scope of the 303(d) list. The state priority waters list includes, among others, waters in need of further assessment and waters altered by exotic species, low regulation, or channel alteration. Data used for listing purposes are evaluated in accordance with Vermont's Water Quality Assessment and Listing Methodology.

- ***Legislative Process***

Lay Monitoring data have been used in the legislative process and for the development of water quality standards. Data used for this purpose must be documented as quality-assured and based on reliable and reproducible field and analytical methods.

- ***TMDL (Total Maximum Daily Load)***

Lay Monitoring data have been used for developing pollution control plans (so-called TMDL analyses) required for all impaired waters on Vermont's 303(d) list.

- ***Federal Funding for Remediation***

Lay Monitoring data have been used to obtain federal funding for remediation projects. Funds go towards projects that cleanup waters with documented water quality problems. The highest quality data will carry the greatest weight when such data are used to direct remediation funds.

- ***Red Flag***

Lay Monitoring data have been used to identify waters where water quality is questionable and requires more in-depth study. Once these waters have been brought to the attention of state and academic parties, professionals can conduct more rigorous research and monitoring.

## SECTION 2

### Lake Reports

#### Lake Champlain

#4 - Button Bay - Broad Lake.....	21	#22 - Maquam Bay.....	33
#7 - Burlington Bay - Broad Lake..	23	#30 - Alburg Bridge.....	35
#9 - Colchester Shoals.....	25	#33 - Burlington Bay.....	37
#10 - Outer Malletts Bay.....	27	#38 - Town Farm Bay.....	39
#11 - Inner Malletts Bay.....	29	#40 - North Beach.....	41
#21 - Keeler Bay.....	31	#41 - Queneska Island.....	43

#### Inland Lakes

Beebe.....	45	Nichols.....	113
Big Pond.....	47	North Montpelier.....	115
Bomoseen.....	49	Parker.....	117
Carmi.....	51	Peacham.....	119
Caspian.....	53	Perch.....	121
Chipman.....	55	Raponda.....	123
Cole.....	57	Rescue.....	125
Coles.....	59	Runnemedede.....	127
Curtis.....	61	Salem.....	129
Danby.....	63	St. Catherine.....	131
Dunmore.....	65	St. Catherine - Little Lake....	133
East Long.....	67	Seymour.....	135
Echo.....	69	Shadow.....	137
Eden.....	71	Silver.....	139
Elfin.....	73	South (Eden).....	141
Elmore.....	75	Sunrise (Orwell/Benson).....	143
Fairfield.....	77	Ticklenaked.....	145
Fairlee.....	79	Valley.....	147
Fosters.....	81	Willoughby.....	149
Great Hosmer.....	83	Woodbury.....	151
Green River.....	85		
Groton.....	87		
Halls.....	89		
Harveys.....	91		
Holland.....	93		
Indian Brook.....	95		
Iroquois.....	97		
Island.....	99		
Joes.....	101		
Maidstone.....	103		
Miles.....	105		
Mirror.....	107		
Morey.....	109		
Newark.....	111		



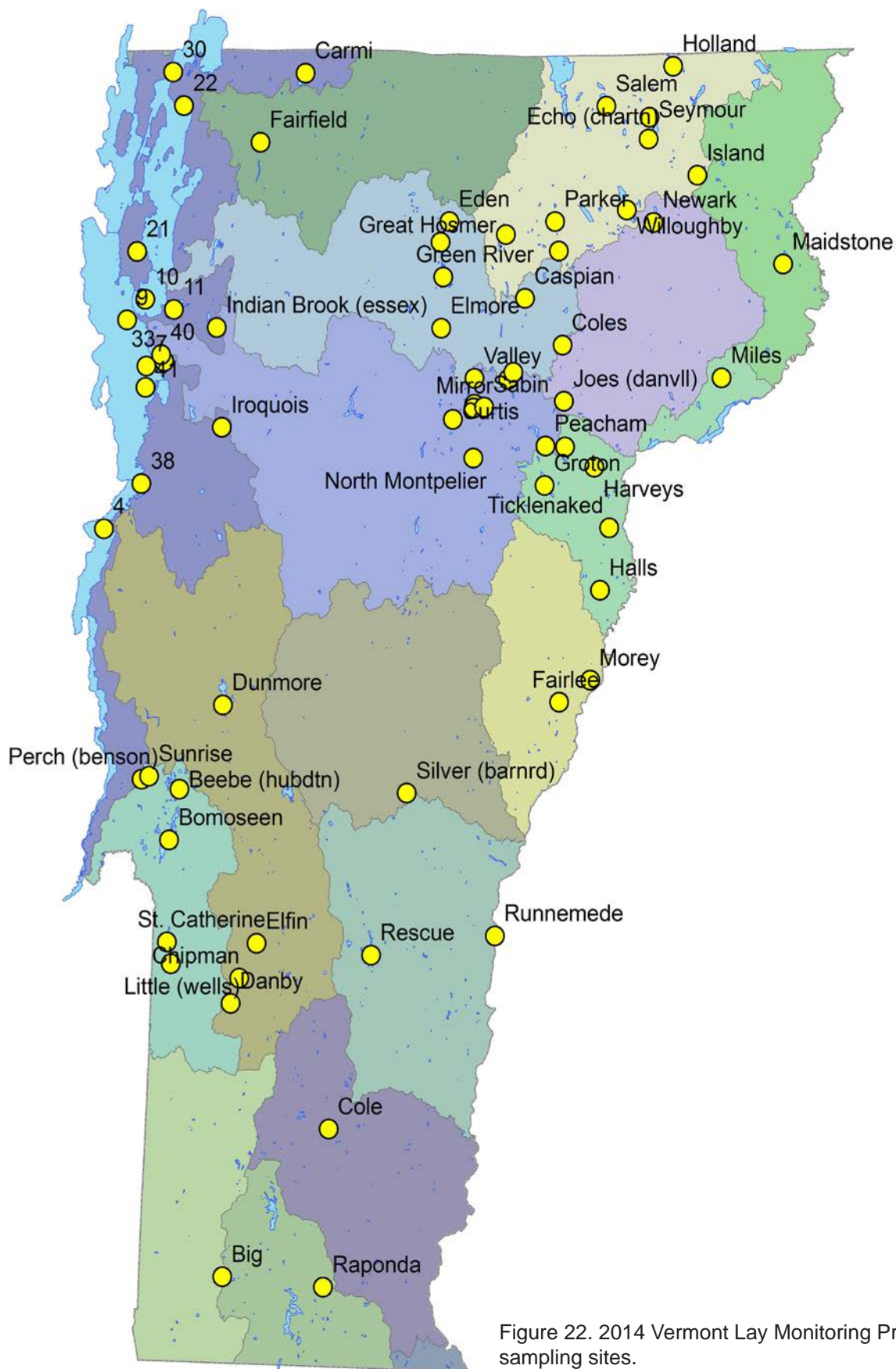


Figure 22. 2014 Vermont Lay Monitoring Program sampling sites.

# BUTTON BAY BROAD LAKE

## Lake Champlain Station #4

**Lay Monitor:** Dick & Joanne Harter  
**Former Lay Monitors:** Vienna and Cole Shea  
 Sue & Amy Miner  
 John Harris

### Location

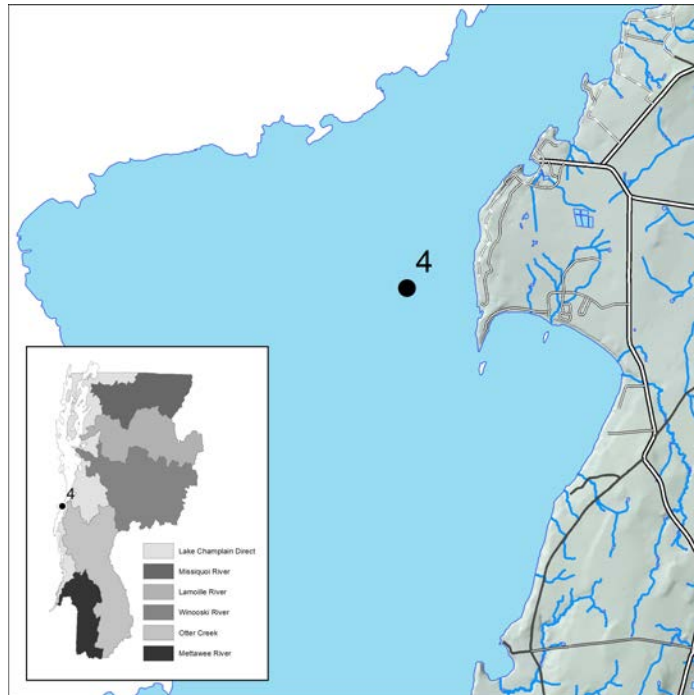
Station #4 is located in the Main Lake between Button Bay and Northwest Bay in approximately 175 ft (53 m) of water.

Latitude: 44° 11' 3.12" N

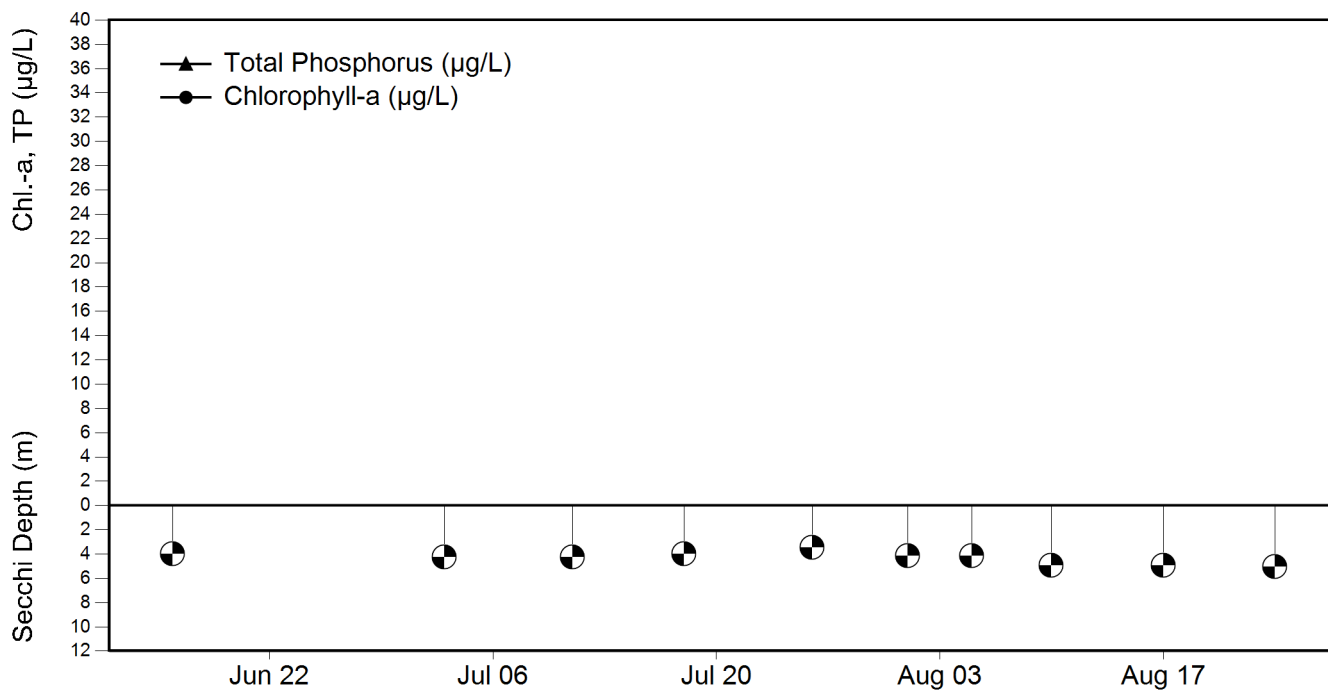
Longitude: 73° 22' 51.96" W

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	10	3.5	4.4	5.1



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# BUTTON BAY BROAD LAKE

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1980	13	3.6	4.4	14.5	
1983	10	3.7	4.1	20.9	
1984	7	3.2	4.1	24.1	
1985	10	4.7	7.6	21.3	
1986	10	4.2	5.3	22.9	
1987	12	4.3	3.8	19.0	
1988	11	4.9	3.5	21.1	
1989	11	3.9	5.7	23.2	
1990	9	3.9	7.4	20.9	
1991	10	4.5	3.2	15.6	
1992	12	4.0	3.8	15.8	
1993	8	3.6	3.8	16.4	
1994	8	3.3	4.3	18.0	
1995	13	5.5	3.5	12.5	
1996	12	4.4	4.6	14.3	

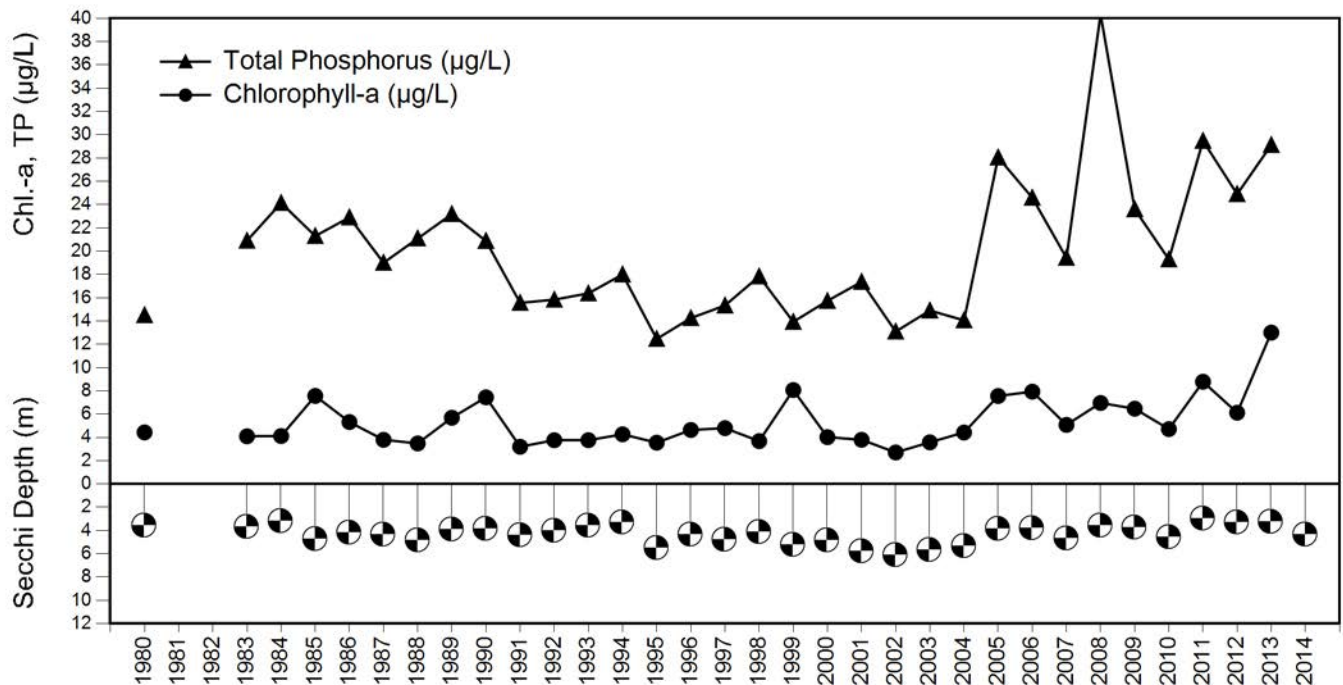
## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	12	4.8	4.8	15.3	
1998	12	4.2	3.7	17.8	
1999	14	5.2	8.1	13.9	
2000	12	4.9	4.0	15.7	
2001	11	5.8	3.8	17.4	
2002	11	6.1	2.7	13.1	
2003	10	5.7	3.6	14.9	
2004	11	5.3	4.4	14.1	
2005	9	3.9	7.6	28.1	
2006	11	3.8	7.9	24.6	
2007	8	4.7	5.1	19.4	
2008	7	3.6	7.0	40.3	
2009	11	3.8	6.5	23.6	
2010	12	4.6	4.7	19.3	
2011	11	3.0	8.8	29.5	
2012	13	3.3	6.1	24.9	
2013	9	3.3	13.0	29.1	
2014	10	4.4			

Compared to other lake stations, the long-term summer means indicate:

Water clarity                      Moderate

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# BURLINGTON BROAD LAKE

## Lake Champlain Station #7

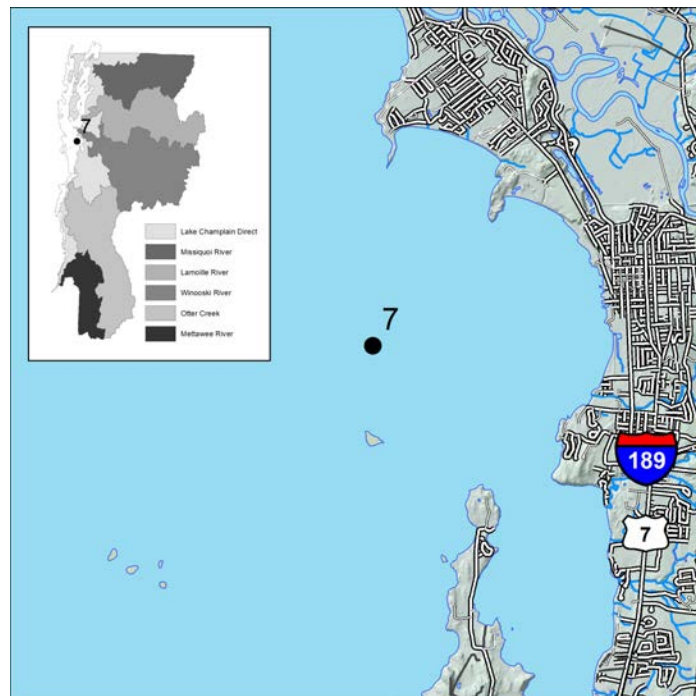
**Lay Monitor:** Gay Godfrey  
**Former Lay Monitors:** Jeremy King  
 John Freeman  
 Ron Bouchard  
 Ron Seeley  
 Fred Fayette  
 Sanford Jacobs  
 Jim Manahan  
 Ray Cloutier

### Location

Station #7 is located in the Main Lake midway between Juniper Island and Appletree Point in approximately 361 ft (110 m) of water.

Latitude: 44° 27' 59.04" N

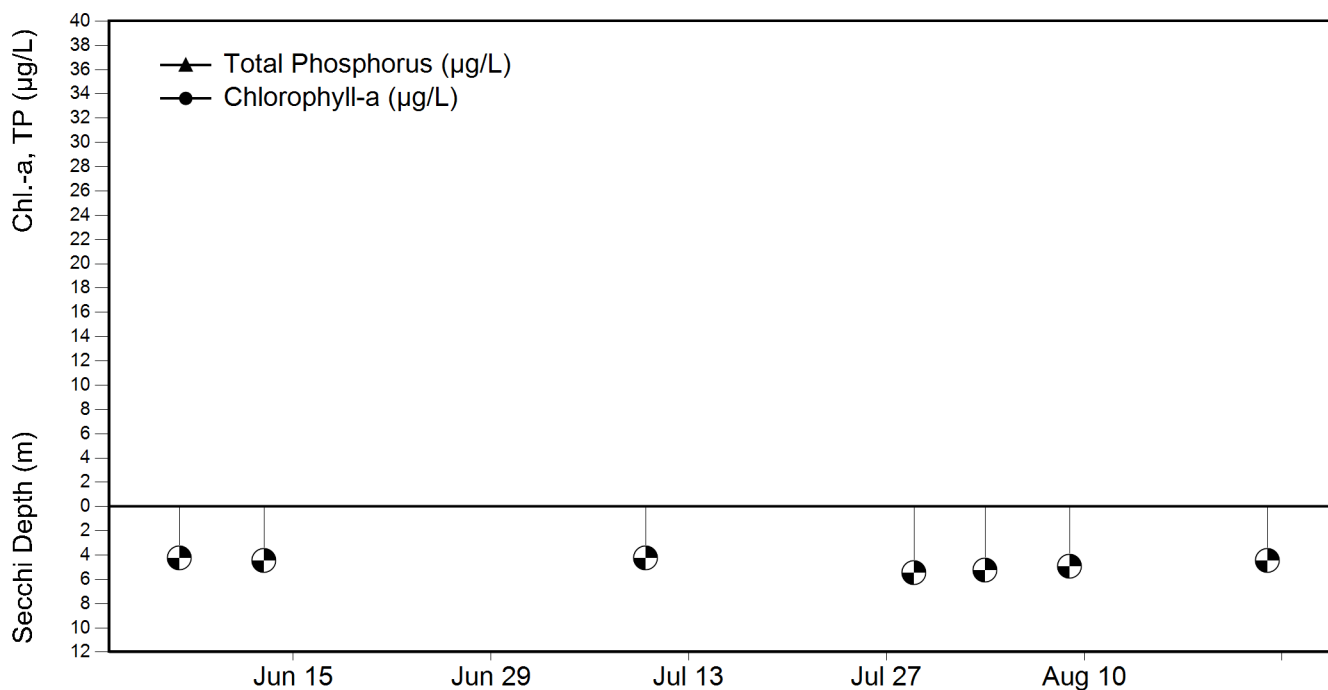
Longitude: 73° 16' 37.92" W



### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	7	4.3	4.8	5.5

### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# BURLINGTON BROAD LAKE

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	12	4.0	4.6	13.4	
1980	13	5.2	4.3	13.9	
1981	12	5.5	3.6	16.5	
1982	9	5.6	3.0	19.8	
1984	11	4.2	4.5	19.9	
1985	6	4.8	3.8	19.2	
1987	11	5.5	4.3	15.4	
1988	13	5.7	3.2	14.6	
1990	6	3.9	4.4	15.5	
1991	8	5.1	2.6	24.8	
1992	13	5.3	4.4	12.4	
1994	11	4.5	4.5	25.4	
1995	8	6.1	3.0	12.1	
1996	6	4.6	3.9	14.5	

## Annual Data

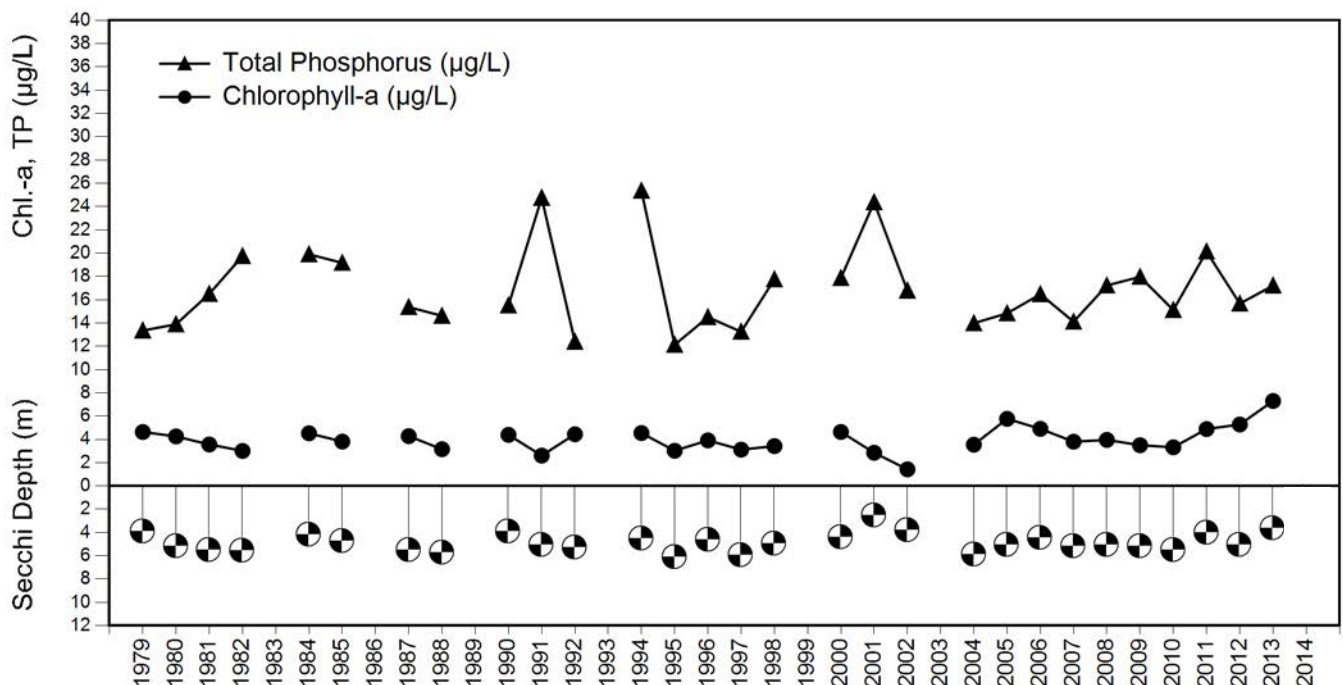
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	8	6.0	3.1	13.3	
1998	8	5.0	3.4	17.8	
2000	7	4.4	4.6	17.9	
2001	8	2.6	2.9	24.4	
2002	9	3.8	1.4	16.8	
2004	10	5.9	3.5	14.0	
2005	13	5.1	5.8	14.8	
2006	11	4.5	4.9	16.5	
2007	11	5.2	3.8	14.1	
2008	10	5.1	4.0	17.2	
2009	9	5.2	3.5	18.0	
2010	9	5.5	3.3	15.1	
2011	10	4.0	4.9	20.1	
2012	9	5.1	5.3	15.7	
2013	9	3.6	7.3	17.2	
2014	7				

Compared to other lake stations, the long-term summer means indicate:

Water clarity

Moderate

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# COLCHESTER SHOALS

## Lake Champlain Station #9

**Lay Monitor:** Paul Gervais  
**Former Lay Monitors:** Don Bailey  
 Garet Livermore  
 Mike Passardi

### Location

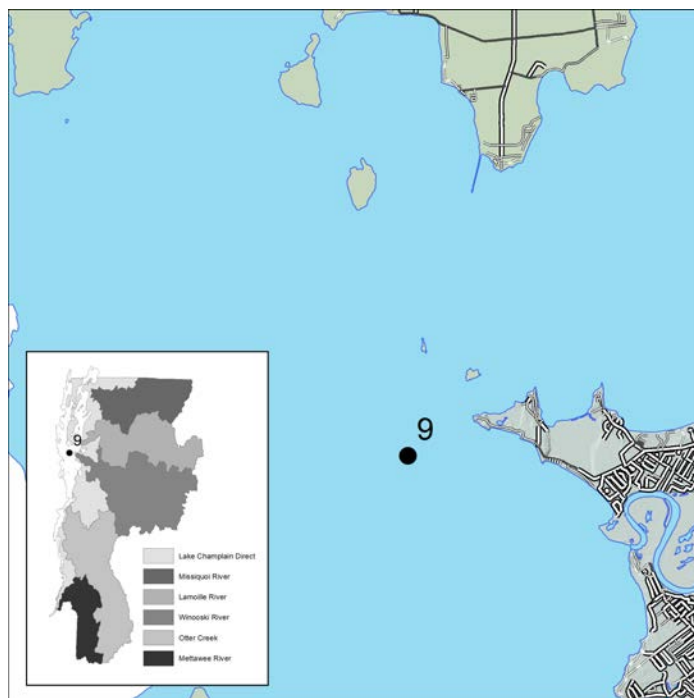
Station #9 is located in the Main Lake section off Colchester Point in approximately 30 ft (9 m) of water.

Latitude: 44° 32' 45.96" N

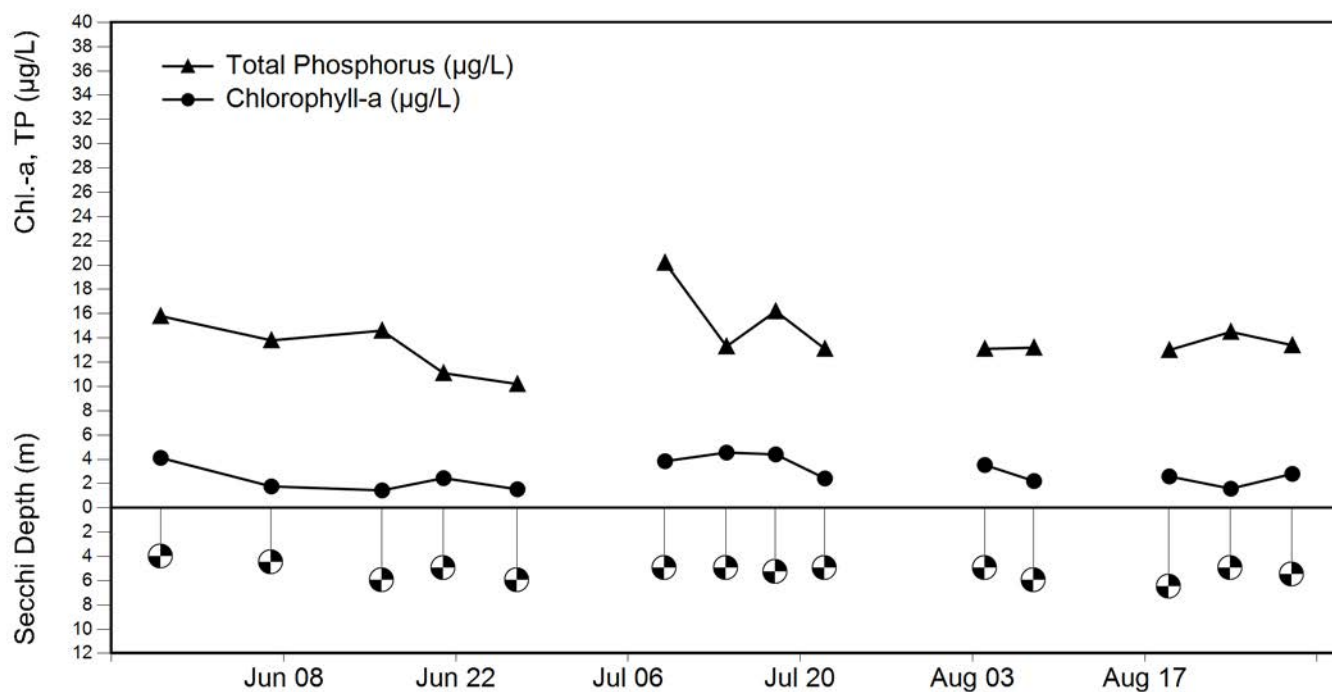
Longitude: 73° 19' 39" W

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	14	4.0	5.3	6.5
Chl-a (µg/L)	14	0.6	2.8	4.7
Summer TP (µg/L)	14	10.2	14.0	20.2



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# COLCHESTER SHOALS

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	4	*B	2.9	11.0	
1981	13	5.2	4.6	12.3	
1983	3	3.6	4.6	20.0	
1985	13	5.5	3.8	16.8	
1988	7	6.3	1.5	16.6	
1992	8	4.8	3.3	16.5	
1995	3	5.3	2.0	15.0	
1996	10	4.5	4.4	10.4	

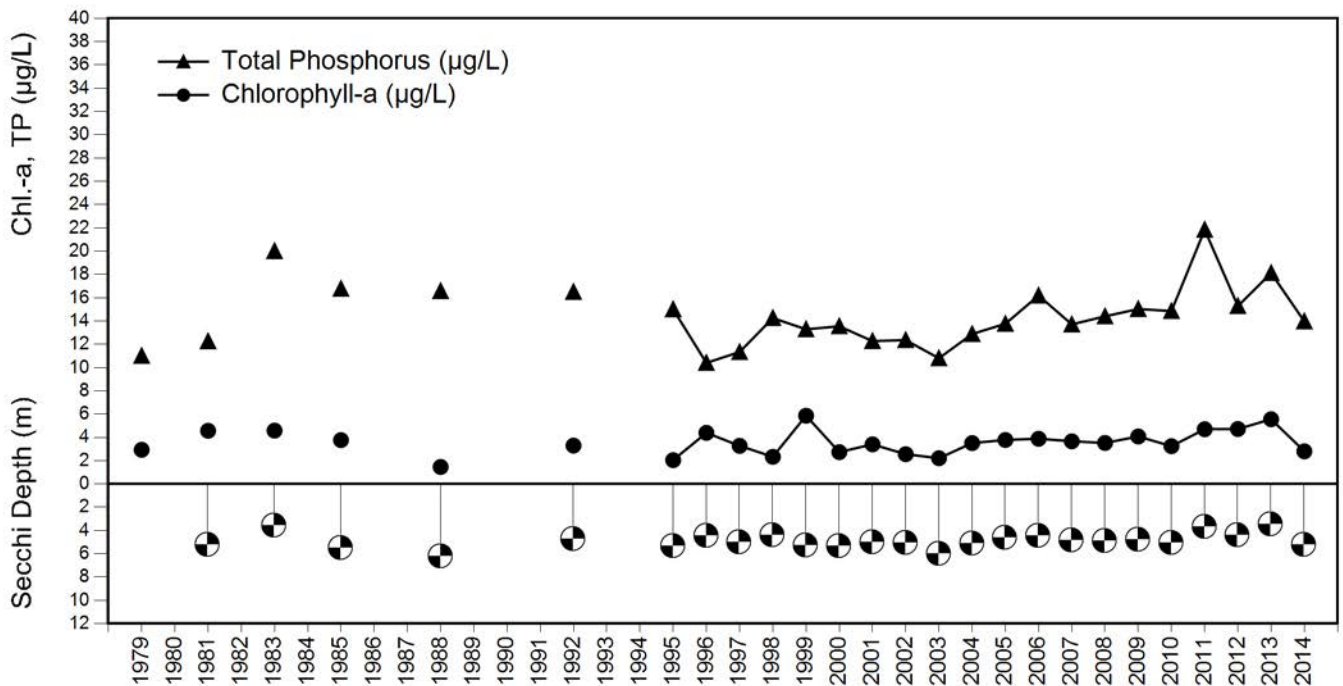
## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	15	5.0	3.3	11.3	
1998	12	4.4	2.3	14.3	
1999	14	5.3	5.9	13.3	
2000	11	5.3	2.7	13.5	
2001	12	5.1	3.4	12.3	
2002	14	5.1	2.6	12.4	
2003	11	6.0	2.2	10.8	
2004	12	5.2	3.5	12.9	
2005	12	4.7	3.8	13.8	
2006	11	4.5	3.9	16.2	
2007	12	4.9	3.7	13.7	
2008	14	4.9	3.5	14.4	
2009	14	4.8	4.1	15.0	
2010	17	5.1	3.2	14.9	
2011	13	3.7	4.7	21.8	
2012	14	4.4	4.7	15.3	
2013	11	3.5	5.6	18.1	
2014	14	5.3	2.8	14.0	

Compared to other lake stations, the long-term summer means indicate:

Water clarity                      High  
 Algal population density      Low  
 Nutrient enrichment          Moderate

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# OUTER MALLETTS BAY

## Lake Champlain Station #10

**Lay Monitors:** Steffen & Kathryn Parker

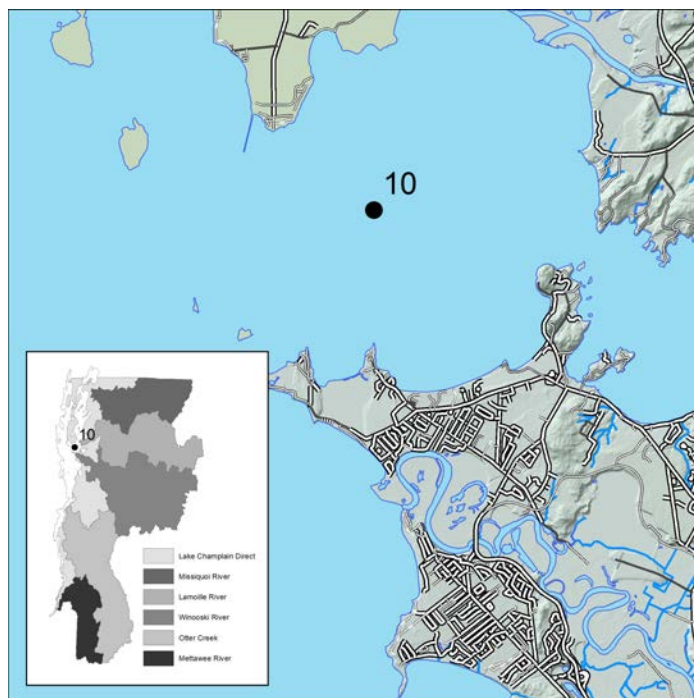
**Former Lay Monitors:** Kelley DesLauriers  
Jeremy King  
John Wood  
Nancy Jacobus  
Richard Kimball  
Suzanne and Michael Wilson  
Bob Fredericks  
Jim Wood

### Location

Station #10 is located midway between Porter's Point and Robinson Point in approximately 105 ft (32 m) of water.

Latitude: 44° 34' 54.84" N

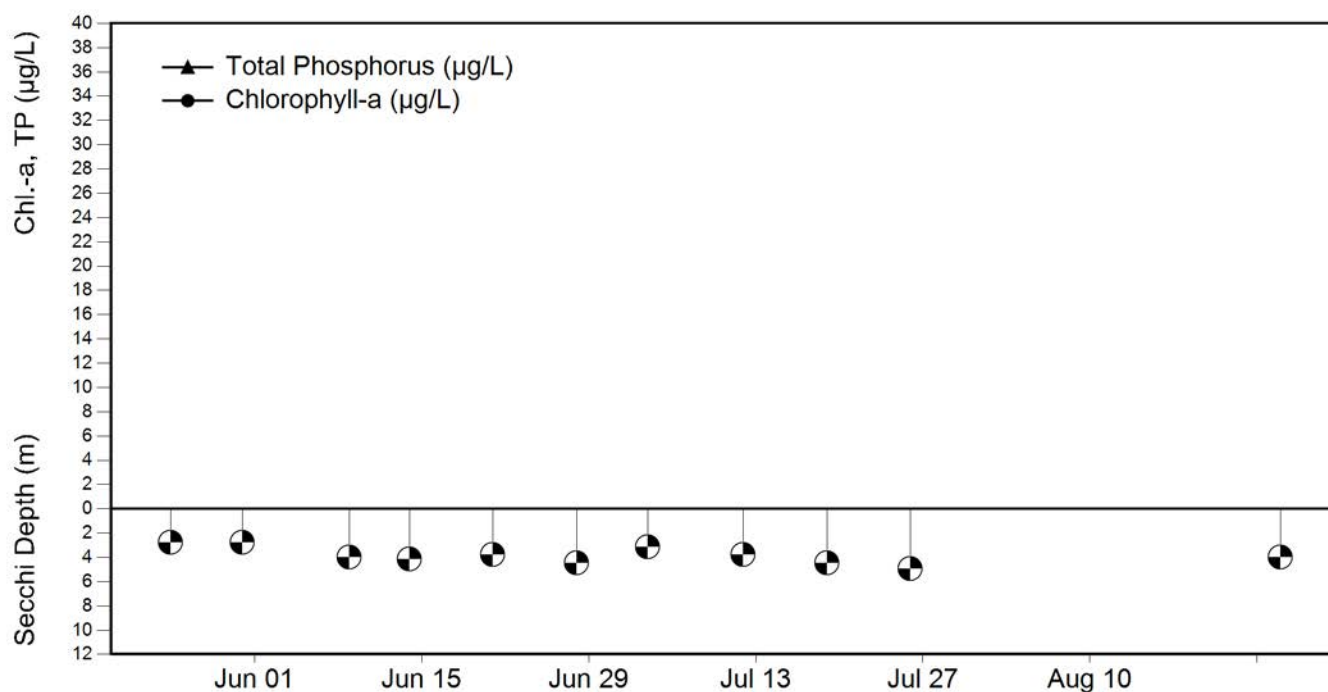
Longitude: 73° 16' 51.96" W



### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	11	2.8	3.9	5.0

### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# OUTER MALLETTS BAY

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	20	5.4	3.4	6.5	
1980	12	7.0	3.4	7.2	
1981	8	6.0	3.4	13.3	
1984	10	4.8	3.6	14.8	
1985	8	4.8	3.7	14.4	
1987	7	5.5	3.2	19.9	
1989	6	6.0	3.7	14.5	
1990	7	5.2	4.2	13.1	
1991	10	6.1	1.4	10.3	
1992	11	7.0	2.6	11.5	
1993	9	5.8	4.5	15.7	
1994	12	5.3	2.0	9.4	
1995	10	6.2	2.6	8.8	
1996	10	4.8	3.7	11.9	

## Annual Data

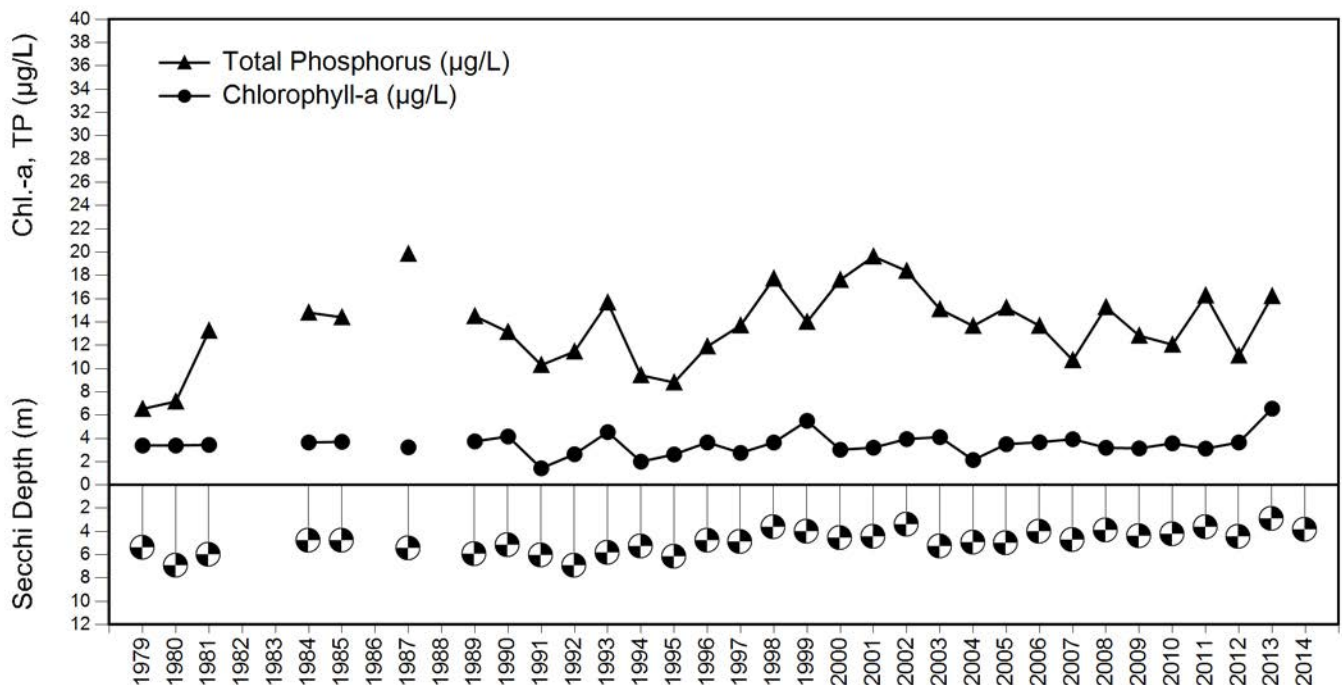
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	11	4.9	2.8	13.7	
1998	11	3.7	3.6	17.7	
1999	12	4.0	5.5	14.0	
2000	14	4.6	3.0	17.6	
2001	11	4.5	3.2	19.6	
2002	13	3.4	3.9	18.4	
2003	13	5.3	4.1	15.1	
2004	9	5.0	2.1	13.7	
2005	9	5.0	3.5	15.2	
2006	17	4.1	3.7	13.7	
2007	17	4.8	3.9	10.7	
2008	13	3.9	3.2	15.3	
2009	19	4.4	3.1	12.8	
2010	15	4.3	3.6	12.1	
2011	15	3.7	3.1	16.3	
2012	14	4.5	3.6	11.1	
2013	16	2.9	6.6	16.2	
2014	11	3.9			

Compared to other lake stations, the long-term summer means indicate:

Water clarity

Moderate

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# INNER MALLETS BAY

## Lake Champlain Station #11

**Lay Monitors:** Steffen & Kathryn  
**Former Lay Monitors:** Parker  
 Bill Dunnington

### Location

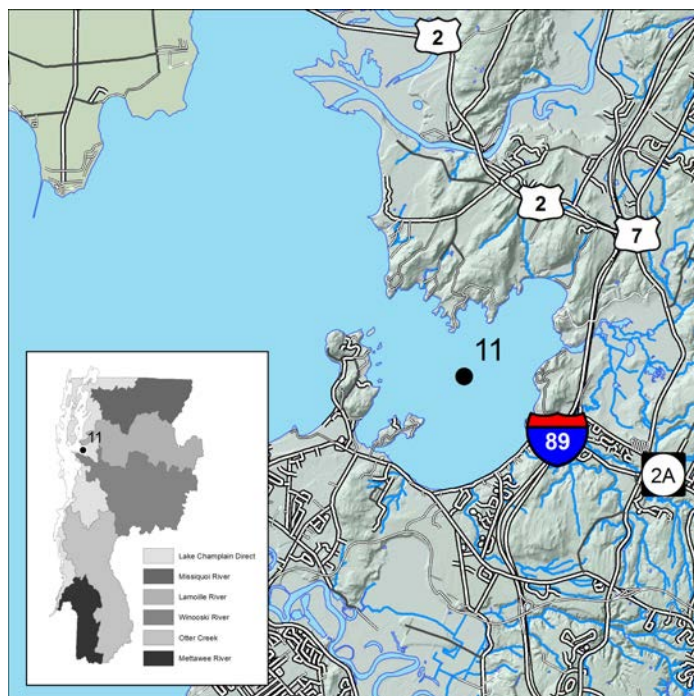
Station #11 is located in the inner section of Malletts Bay in approximately 75 ft (23 m) of water.

Latitude: 44° 33' 54" N

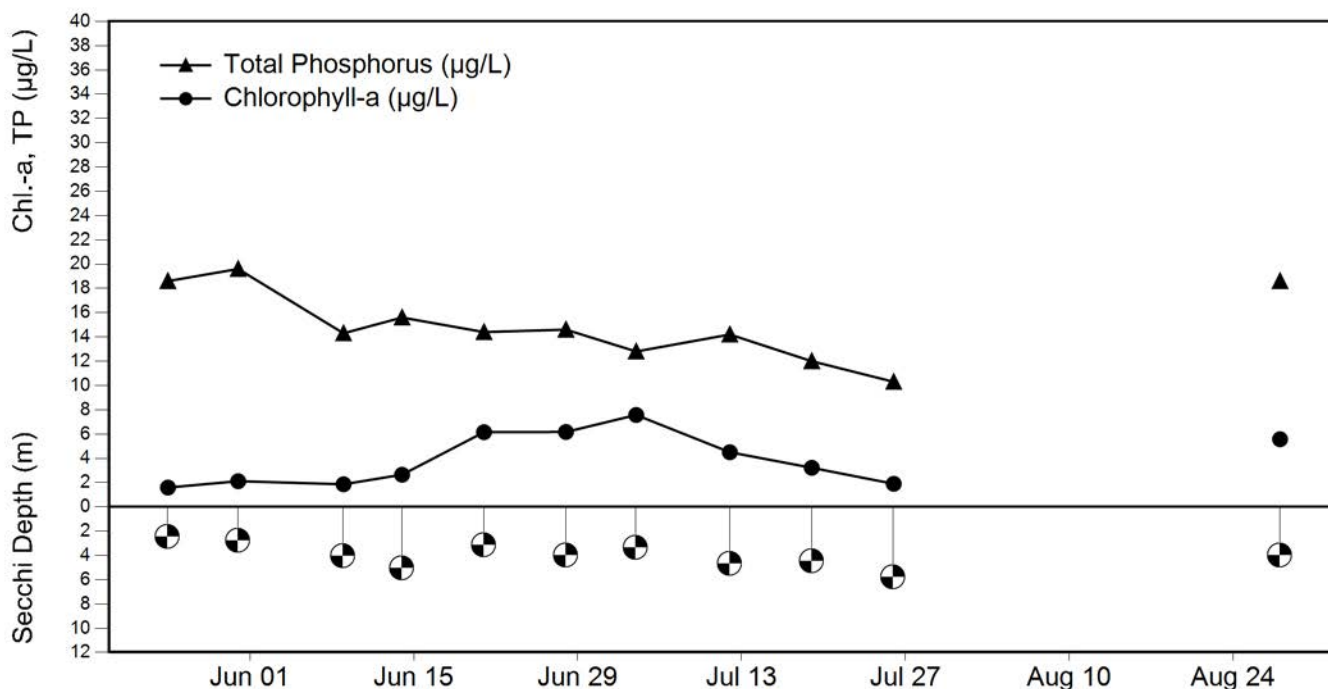
Longitude: 73° 12'29.88" W

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	11	2.5	4.0	5.8
Chl-a (µg/L)	11	1.5	3.9	7.6
Summer TP (µg/L)	11	10.3	15.0	19.6



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





## INNER MALLETTS BAY

### Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	19	4.6	3.5	7.7	
1980	13	6.6	3.1	6.6	
1981	8	6.1	4.1	9.6	
1983	12	6.1	3.8	11.6	
1984	13	4.2	4.5	12.4	
1985	11	5.2	4.1	13.1	
1987	13	4.5	3.7	15.1	
1988	11	5.0	2.8	10.8	
1989	13	4.9	4.4	12.3	
1990	13	4.7	4.5	10.5	
1991	13	5.2	1.7	10.7	
1992	12	5.7	2.4	10.2	
1993	10	4.9	3.2	8.9	
1994	12	4.8	2.2	9.3	
1995	11	5.8	3.0	9.6	
1996	13	4.1	4.2	13.5	

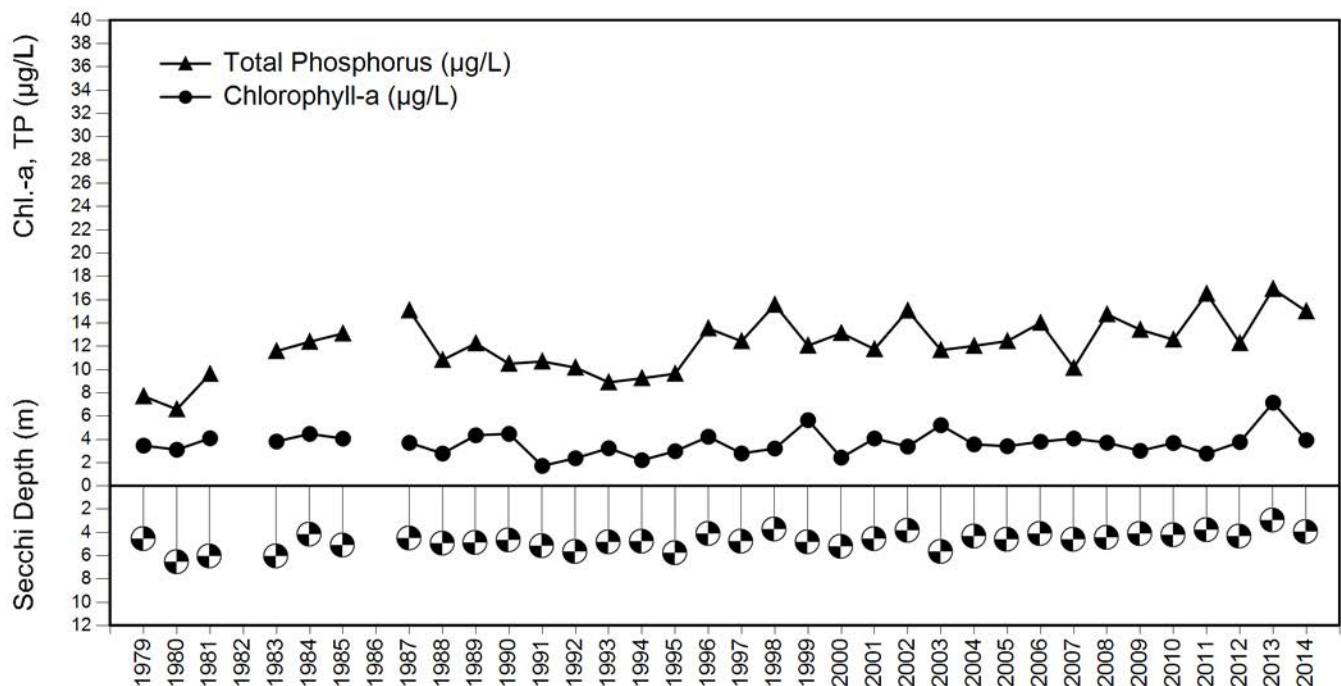
### Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	14	4.8	2.8	12.4	
1998	16	3.7	3.2	15.6	
1999	18	4.9	5.7	12.1	
2000	15	5.2	2.4	13.1	
2001	17	4.6	4.1	11.8	
2002	17	3.9	3.4	15.1	
2003	16	5.7	5.2	11.7	
2004	15	4.4	3.6	12.0	
2005	12	4.7	3.4	12.4	
2006	19	4.2	3.8	14.0	
2007	18	4.7	4.1	10.1	
2008	13	4.5	3.7	14.7	
2009	19	4.2	3.0	13.4	
2010	16	4.3	3.7	12.6	
2011	15	3.8	2.8	16.5	
2012	15	4.4	3.8	12.3	
2013	16	3.0	7.2	16.9	
2014	11	4.0	3.9	15.0	

**Compared to other lake stations, the long-term summer means indicate:**

Water clarity                      Moderate  
 Algal population density      Moderate  
 Nutrient enrichment          High

**Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth**



# KEELER BAY

## Lake Champlain Station #21

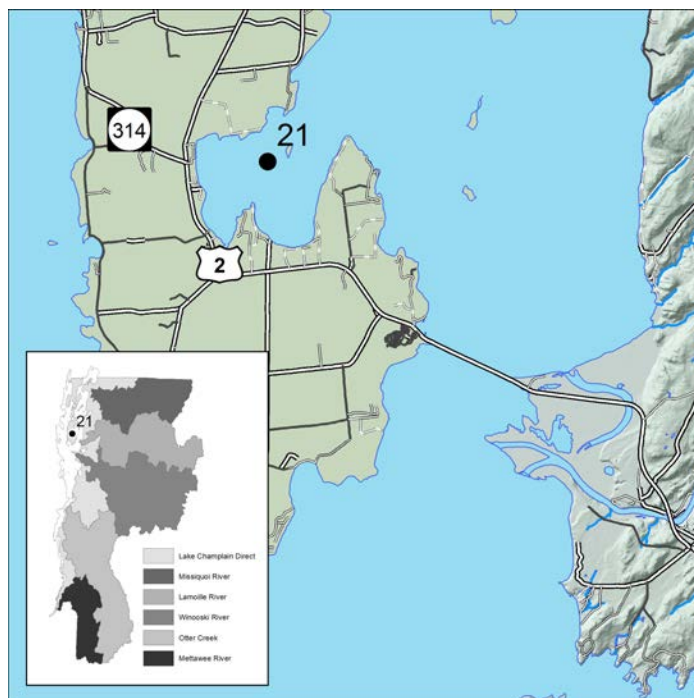
**Lay Monitor:** Peter Velasquez  
**Former Lay Monitors:** Patsy Bean  
 Jeremy King  
 Dick & Joanne Harter  
 Walter Burnett  
 Lawrence Pyne  
 Kathy & Jim Murray

### Location

Station #21 is located in Keeler Bay off Kellogg Island in approximately 30 ft (9 m) of water.

Latitude: 44° 39' 52.92" N

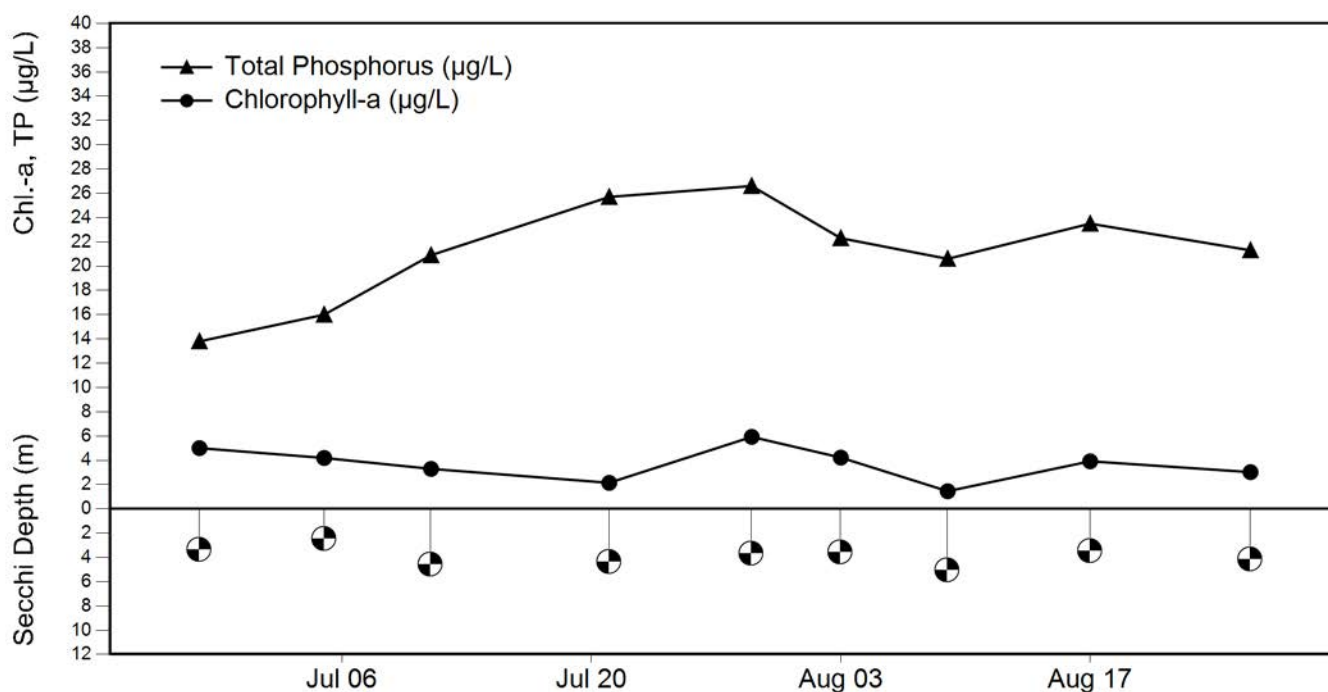
Longitude: 73° 18' 11.88 W



### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	2.5	3.9	5.1
Chl-a (µg/L)	9	1.4	3.7	6.2
Summer TP (µg/L)	9	13.8	21.2	26.6

### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# KEELER BAY

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	18	4.0			
1980	10	4.8			
1981	6	3.4			
1982	9	4.9			
1983	10	4.3			
1984	10	4.1			
1985	13	4.7	3.0	18.9	
1986	11	4.4	4.2	17.6	
1987	13	4.7	3.1	16.6	
1988	12	4.3	5.1	20.8	
1989	12	5.0	3.9	20.1	
1990	8	4.8	5.2	18.8	
1991	3	5.0	4.8	15.3	
1992	11	4.8	3.2	15.5	
1993	12	4.7	3.2	19.0	
1994	14	4.7	3.7	17.5	
1996	9	4.9	5.5	14.6	

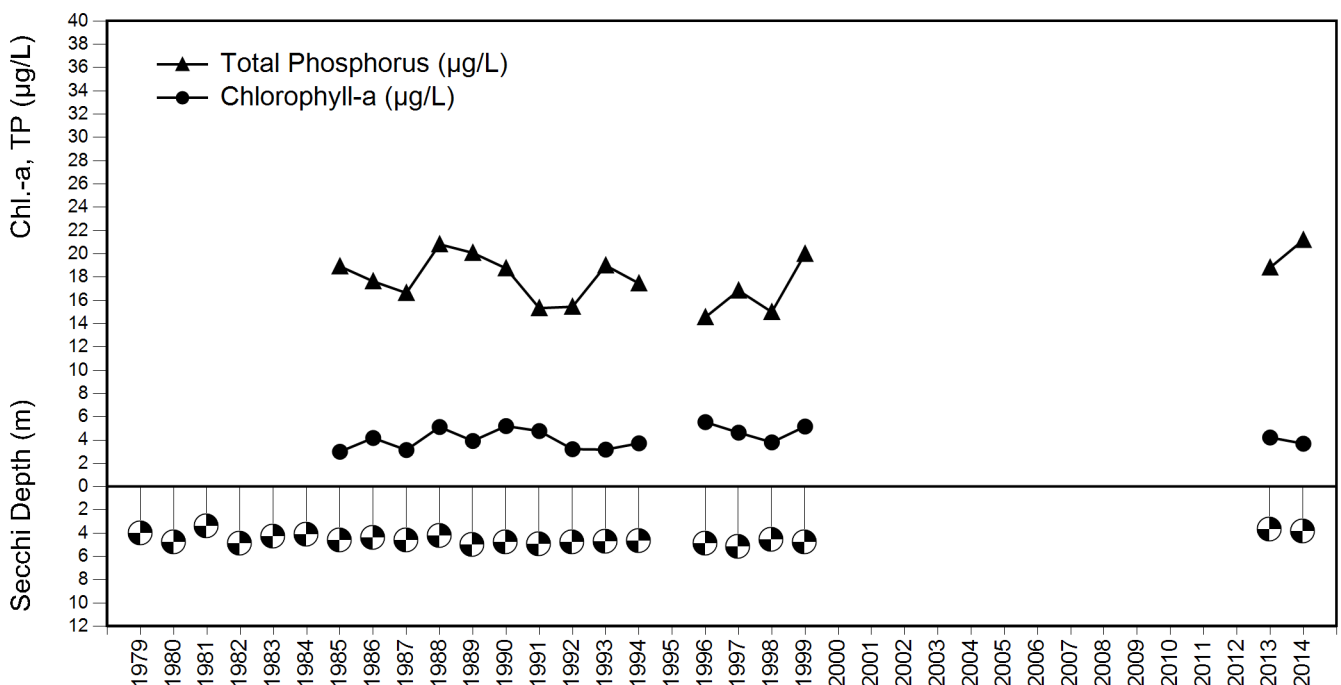
## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	13	5.2	4.6	16.8	
1998	12	4.6	3.8	15.0	
1999	6	4.8	5.2	20.0	
2013	10	3.7	4.2	18.8	
2014	9	3.9	3.7	21.2	

**Compared to other lake stations, the long-term summer means indicate:**

Water clarity                      Moderate  
 Algal population density      Moderate  
 Nutrient enrichment          High

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# MAQUAM BAY

## Lake Champlain Station #22

**Lay Monitor:** Barbara & Bill Duval  
**Former Lay Monitors:** Lori Kraft  
 Skip and Linda Rice  
 David Reissig

### Location

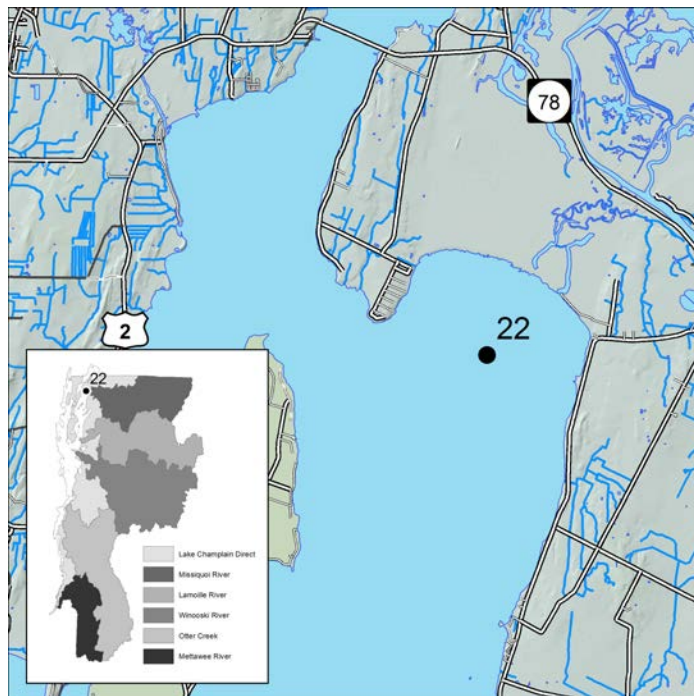
Station #22 is located in the Northeast Arm section in Maquam Bay in approximately 26 ft (8 m) of water.

Latitude: 44° 55' 4.08" N

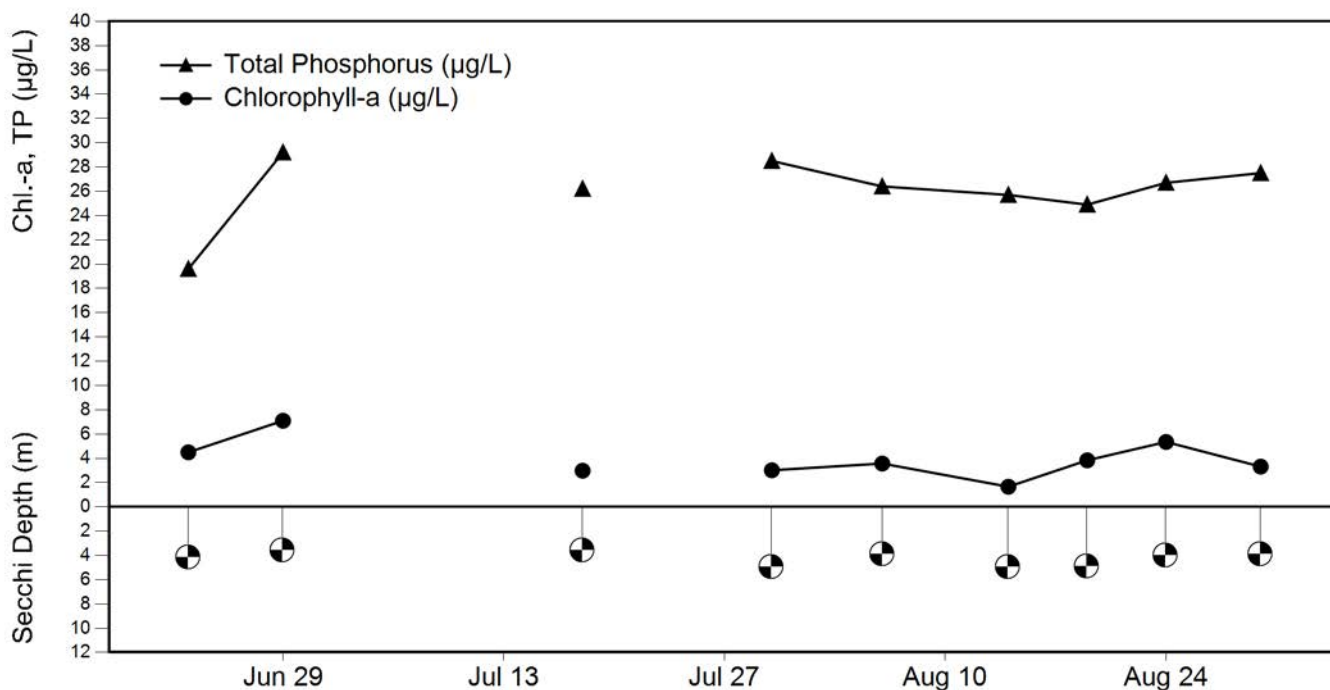
Longitude: 73° 11' 11.04" W

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	3.6	4.2	5.0
Chl-a (µg/L)	9	1.6	3.9	7.1
Summer TP (µg/L)	9	19.6	26.1	29.2



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# Maquam Bay

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1981	10	5.9			
1982	8	6.9			
1983	4	6.0			
1984	6	6.5			
1985	7	*B			
1987	7	5.2			
1988	5	*B			
1990	6	6.1	7.8	17.7	
1991	11	*B	2.2	15.0	
1992	7	5.8	2.5	20.1	
1993	13	5.4	3.3	16.5	
1994	10	5.1	3.9	16.8	
1995	12	4.9	3.0	16.3	
1996	12	*B	4.5	15.6	

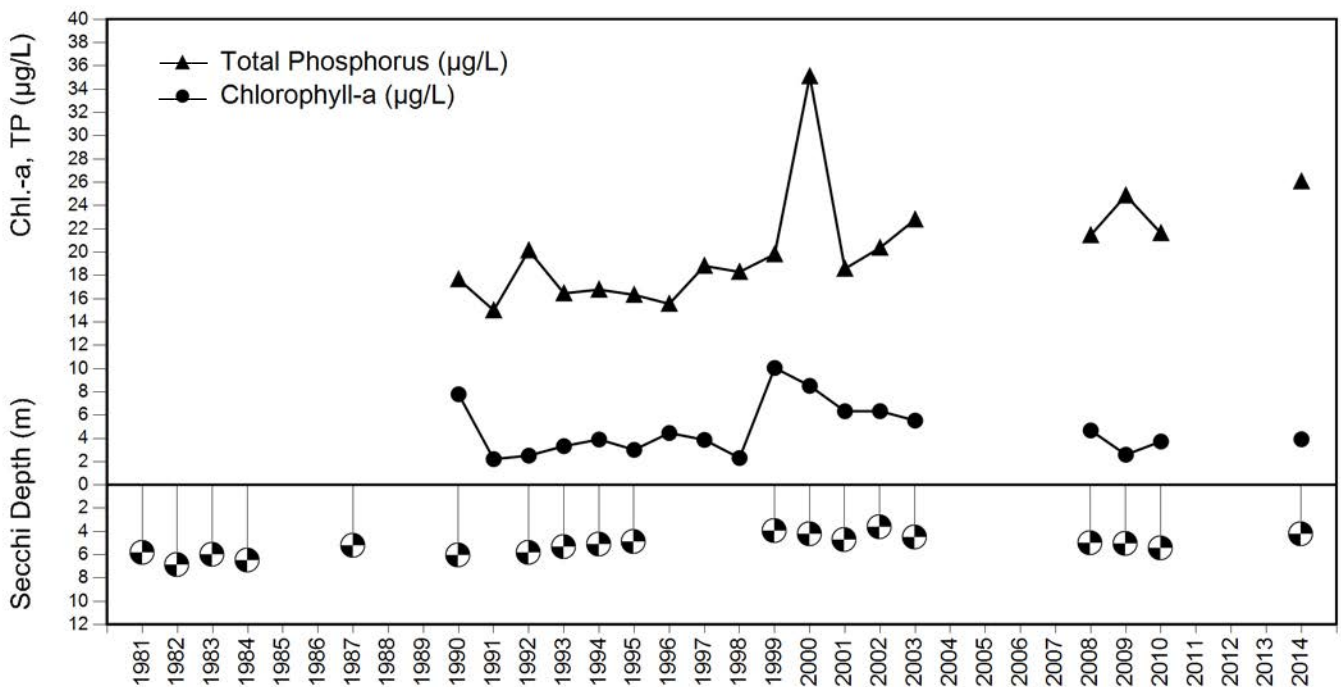
## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	12	*B	3.9	18.8	
1998	12	*B	2.3	18.3	
1999	11	4.0	10.1	19.8	
2000	9	4.3	8.5	35.1	
2001	10	4.8	6.3	18.6	
2002	9	3.7	6.3	20.4	
2003	10	4.5	5.5	22.8	
2008	9	5.0	4.7	21.5	
2009	13	5.1	2.6	24.9	
2010	10	5.5	3.7	21.6	
2014	9	4.2	3.9	26.1	

Compared to other lake stations, the long-term summer means indicate:

Water clarity                      Moderate  
 Algal population density      Moderate  
 Nutrient enrichment          High

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# ALBURG BRIDGE

## Lake Champlain Station #30

**Lay Monitor:** Paul Hansen  
**Former Lay Monitors:** Betty & Ken Hagedorn  
 Barbara & Bill Duval

### Location

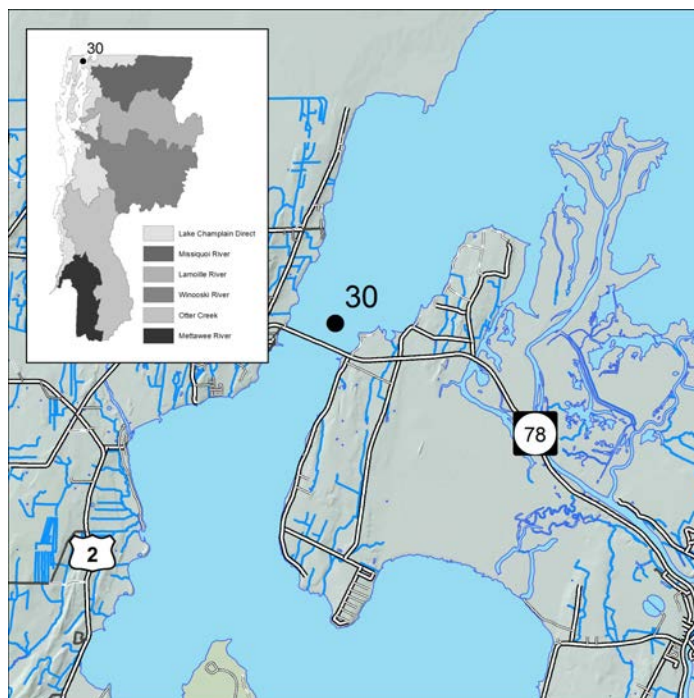
Station #30 is located in the "outlet" area of Missisquoi Bay, just north of the Route 78 Alburg-West Swanton bridge in approximately 15 ft (4.5 m) of water.

Latitude: 44° 58' 32.88" N

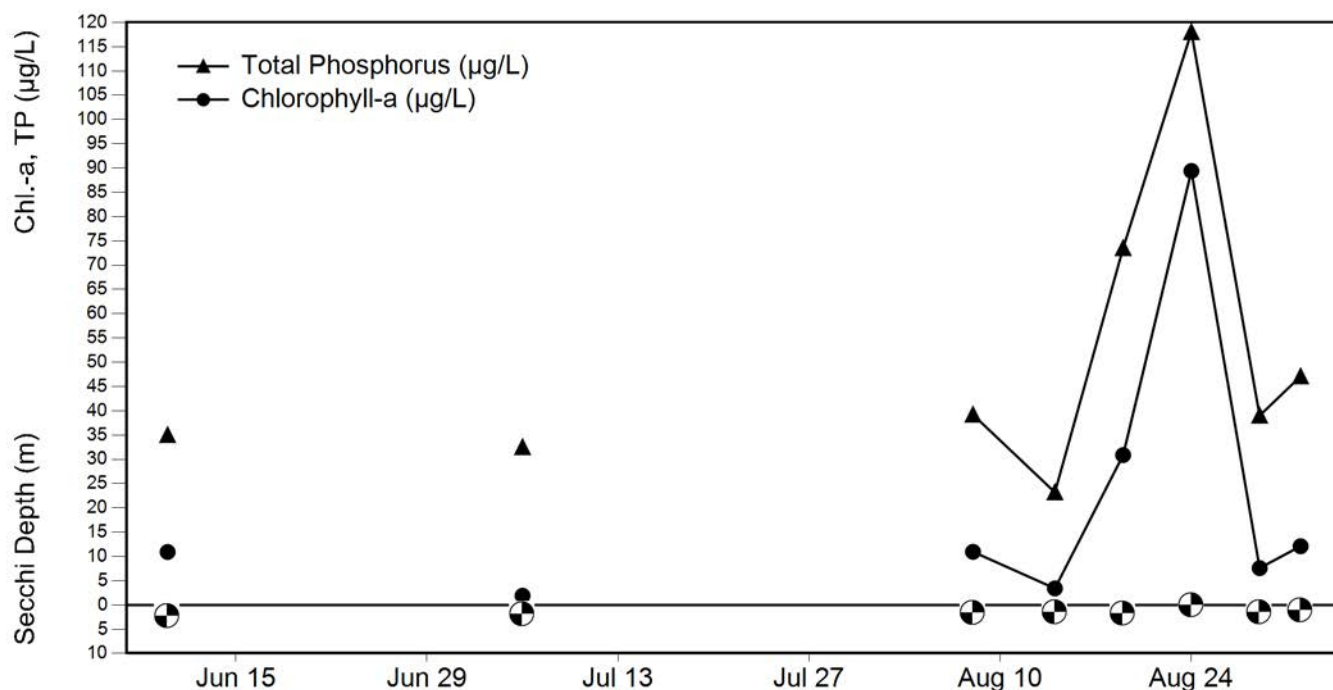
Longitude: 73° 12' 54" W

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	8	0.1	1.5	2.4
Chl-a (µg/L)	8	1.7	20.9	125.1
Summer TP (µg/L)	8	23.2	50.9	118.0



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# ALBURG BRIDGE

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1983	9	2.7	4.9	31.3	
1984	11	2.0	13.5	43.6	
1985	6	2.2	6.5	38.7	
1986	9	2.5	6.6	31.7	
1987	12	2.4	4.7	33.6	
1988	10	2.4	7.3	34.4	
1989	13	*B	9.7	26.7	
1990	11	2.8	9.7	26.2	
1991	9	1.8	15.2	39.2	
1992	12	2.3	8.0	38.4	
1993	10	2.0	11.6	38.8	
1994	11	2.1	11.7	42.5	
1995	12	1.8	16.6	46.4	
1996	10	2.1	15.2	30.7	

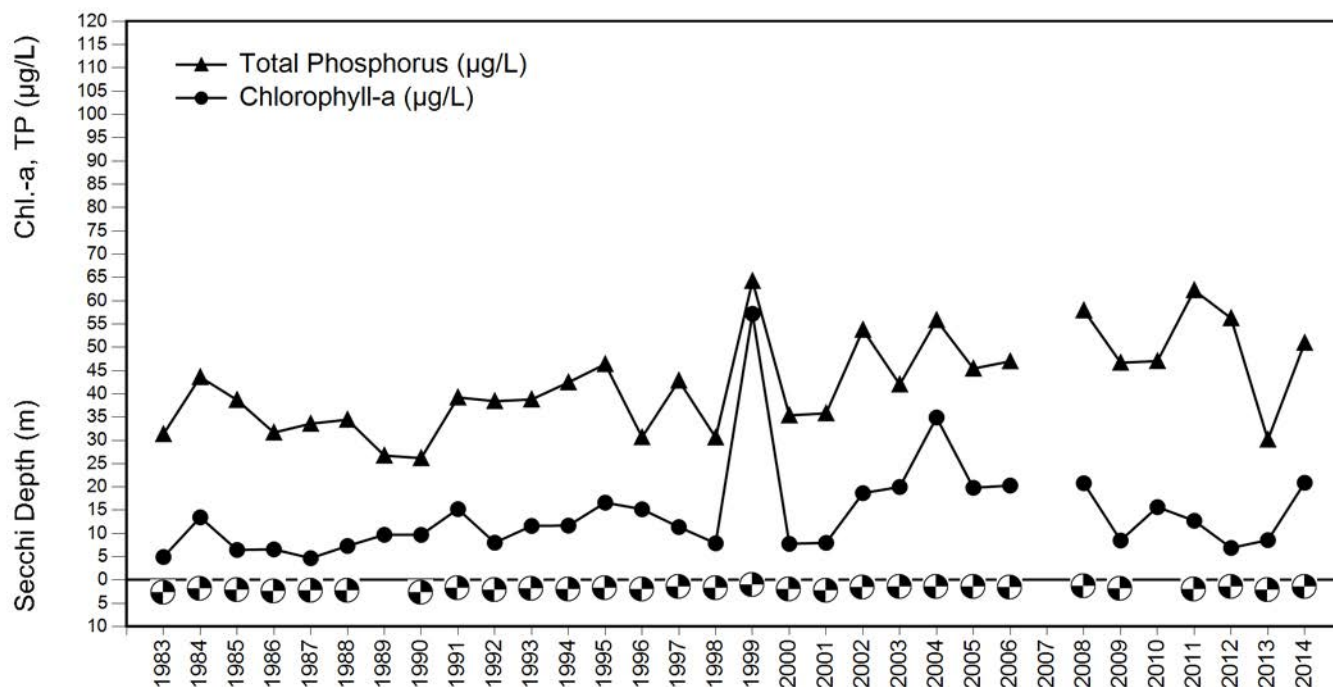
## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	11	1.6	11.4	42.8	
1998	10	1.7	7.9	30.6	
1999	9	1.2	57.2	64.2	
2000	9	2.1	7.8	35.4	
2001	10	2.3	8.0	35.8	
2002	9	1.7	18.7	53.8	
2003	8	1.5	20.0	42.0	
2004	11	1.5	34.9	55.8	
2005	10	1.6	19.8	45.4	
2006	9	1.6	20.3	47.0	
2008	10	1.4	20.8	57.9	
2009	11	1.9	8.5	46.7	
2010	8	*B	15.7	47.0	
2011	9	2.0	12.7	62.2	
2012	10	1.6	6.9	56.2	
2013	11	2.2	8.6	30.1	
2014	8	1.5	20.9	50.9	

Compared to other lake stations, the long-term summer means indicate:

Water clarity Low  
 Algal population density High  
 Nutrient enrichment High

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# BURLINGTON BAY

## Lake Champlain Station #33

**Lay Monitor:** Jonathan Eddy

**Former Lay** Don Bailey

**Monitors:**

### Location

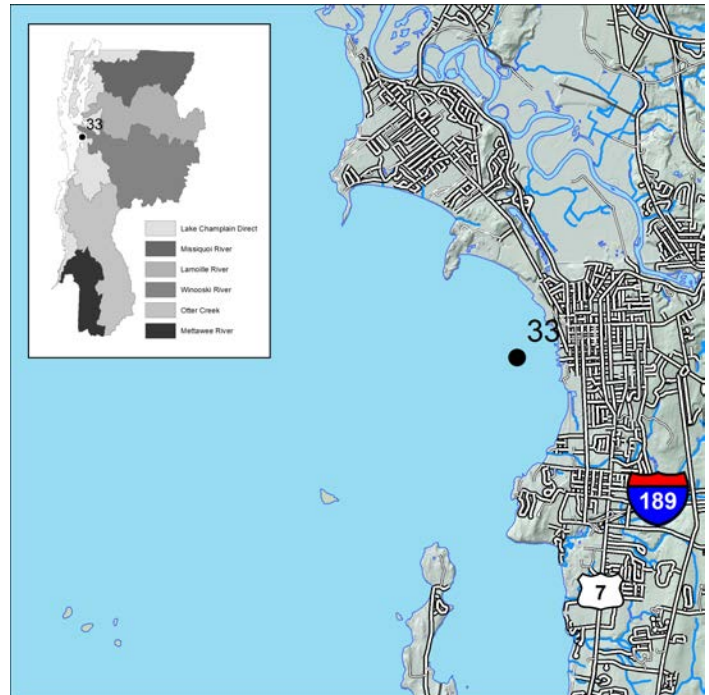
Station #33 is located across from the Burlington waterfront in the middle of Burlington Bay in approximately 49 ft (15 m) of water.

Latitude: 44° 28' 58.92" N

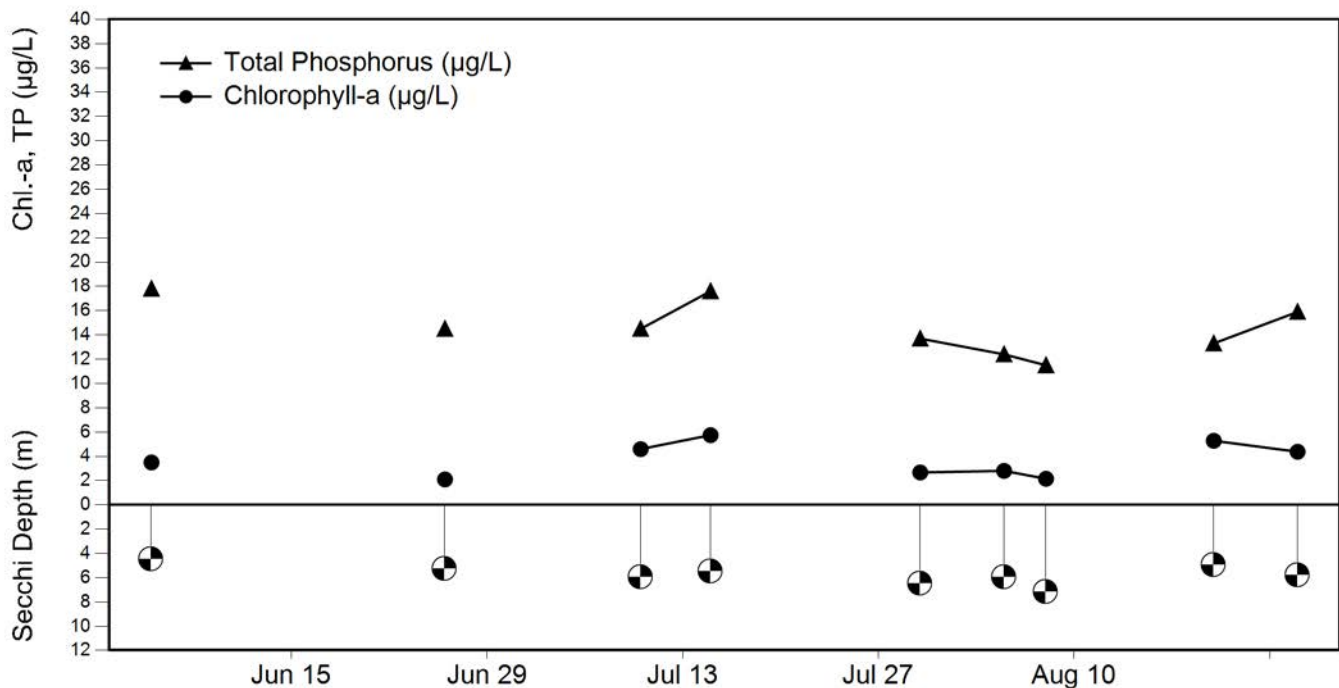
Longitude: 73° 13' 54.12" W

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	4.5	5.8	7.2
Chl-a (µg/L)	9	2.0	3.7	6.2
Summer TP (µg/L)	9	11.5	14.6	17.8



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# BURLINGTON BAY

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1992	13	5.1	3.8	15.4	
1993	13	4.4	4.9	18.2	
1994	6	4.6	3.7	13.0	
1995	8	5.9	2.5	11.8	
1996	8	4.2	4.2	16.6	

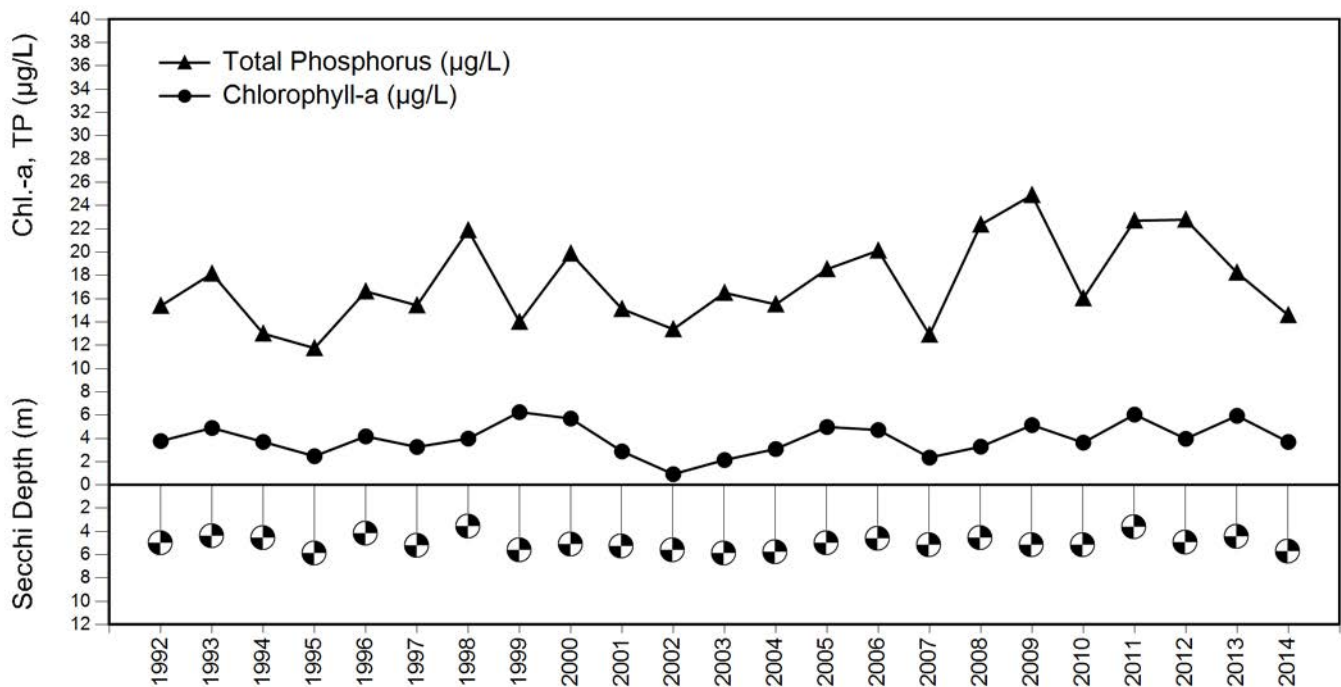
## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	7	5.3	3.3	15.4	
1998	8	3.6	4.0	21.9	
1999	8	5.6	6.3	14.0	
2000	8	5.2	5.7	19.9	
2001	9	5.3	2.9	15.1	
2002	8	5.6	0.9	13.4	
2003	8	5.9	2.1	16.5	
2004	10	5.8	3.1	15.5	
2005	9	5.0	5.0	18.5	
2006	9	4.7	4.7	20.1	
2007	8	5.2	2.4	12.9	
2008	10	4.6	3.3	22.4	
2009	9	5.2	5.1	24.9	
2010	9	5.2	3.6	16.0	
2011	9	3.6	6.0	22.7	
2012	9	5.0	4.0	22.8	
2013	9	4.5	5.9	18.2	
2014	9	5.8	3.7	14.6	

Compared to other lake stations, the long-term summer means indicate:

Water clarity                      High  
 Algal population density      Moderate  
 Nutrient enrichment          High

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# TOWN FARM BAY

## Lake Champlain Station #38

**Lay Monitors:** Carol Hanley & Richard Bernstein

### Location

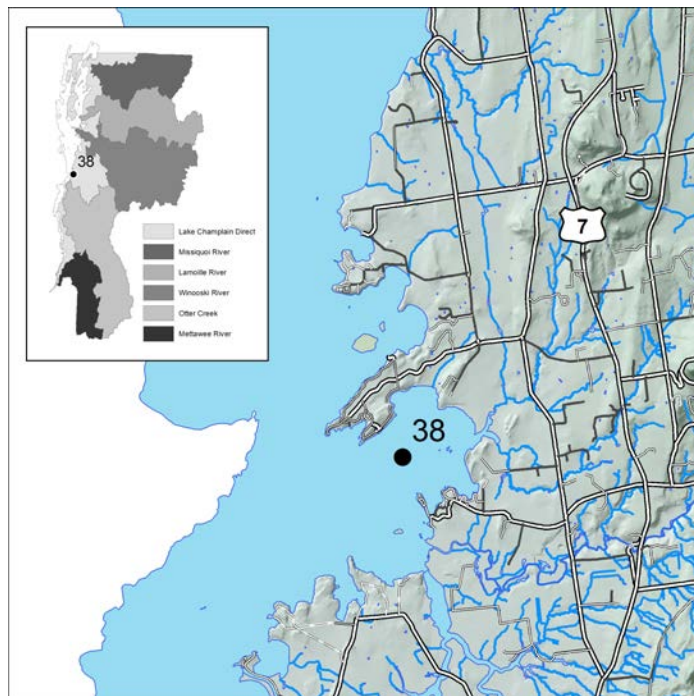
Station #38 is located in Town Farm Bay north of Long Point in approximately 27 ft (8 m) of water.

Latitude: 44° 15' 46.8" N

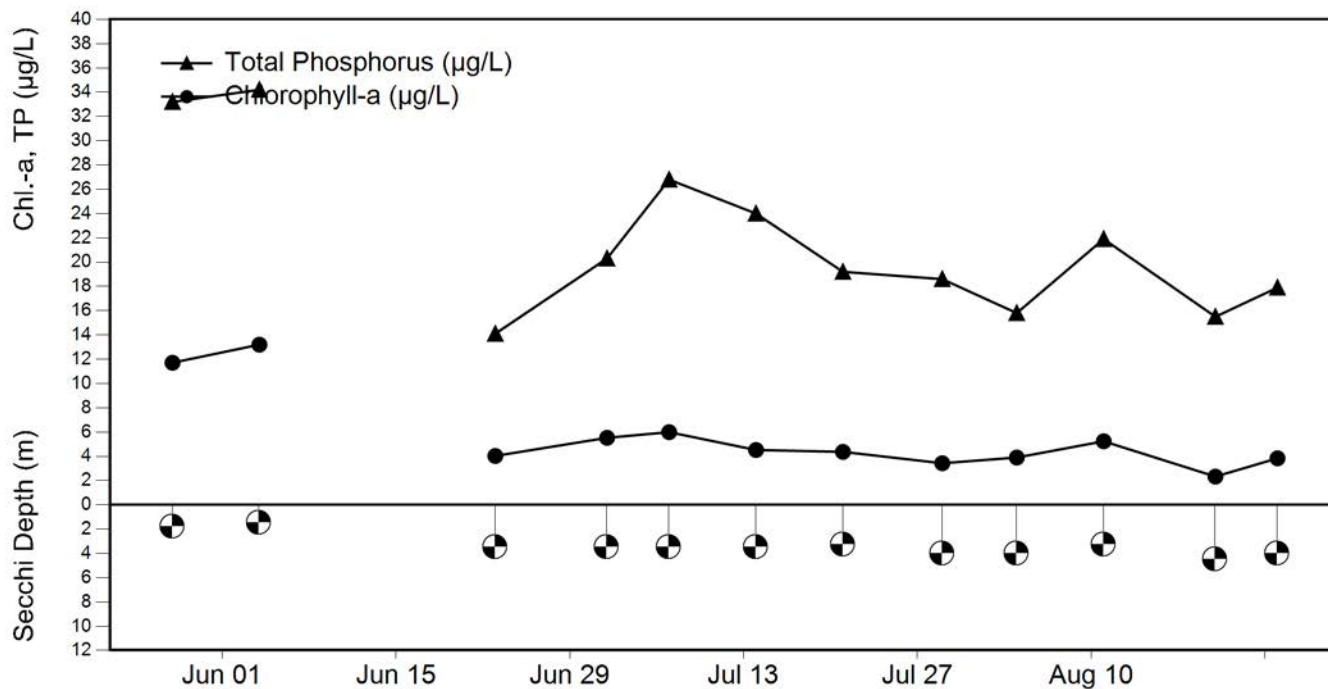
Longitude: 73° 17' 13.2" W

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	12	1.5	3.4	4.5
Chl-a (µg/L)	12	1.6	5.7	13.3
Summer TP (µg/L)	12	14.1	21.8	34.2



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





## TOWN FARM BAY

### Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a ( $\mu\text{g/l}$ )	Summer TP ( $\mu\text{g/l}$ )	Spring TP ( $\mu\text{g/l}$ )
2008	12	2.6	10.5	29.9	
2009	13	2.9	6.9	24.5	
2010	13	3.6	4.9	19.3	
2011	14	2.0	10.9	27.8	
2012	13	2.5	6.8	27.5	
2013	10	2.3	10.9	27.8	
2014	12	3.4	5.7	21.8	

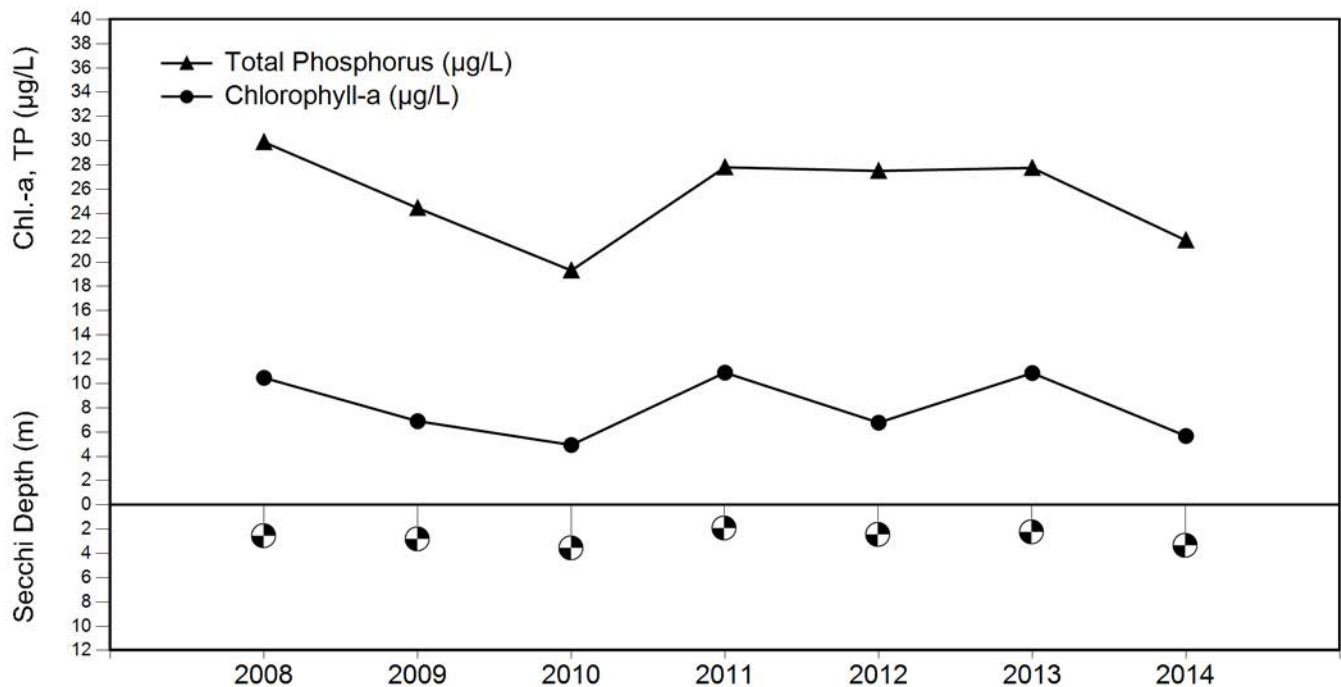
**Compared to other lake stations, the long-term summer means indicate:**

Water clarity                      Moderate

Algal population density      Moderate

Nutrient enrichment          High

**Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth**



# NORTH BEACH

## Lake Champlain Station #40

**Lay Monitor:** Jen Guimaraes, Lake Champlain  
**Former Lay Monitors:** Community Sailing Center (LCCSC)  
 Nick Neverisky, LCCSC

### Location

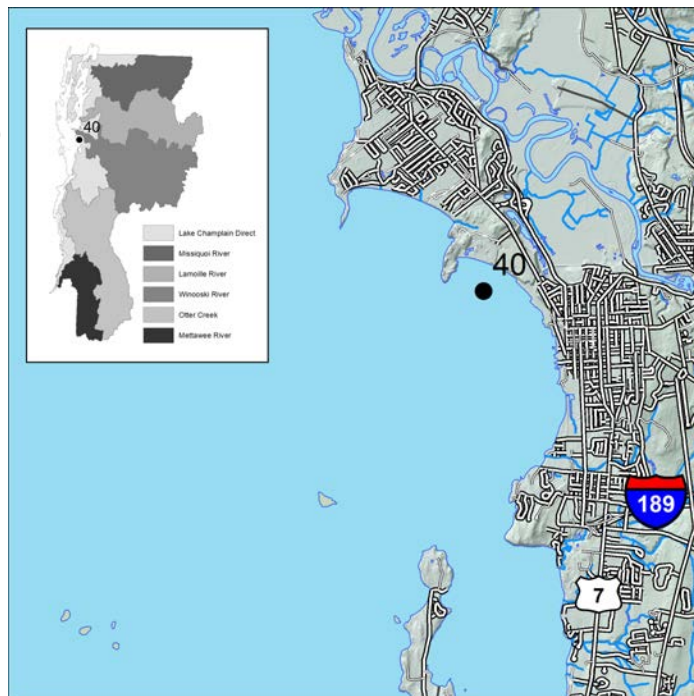
Station #40 is located straight off North Beach in Burlington in approximately 39 ft (12 m) of water.

Latitude: 44° 29' 11.76" N

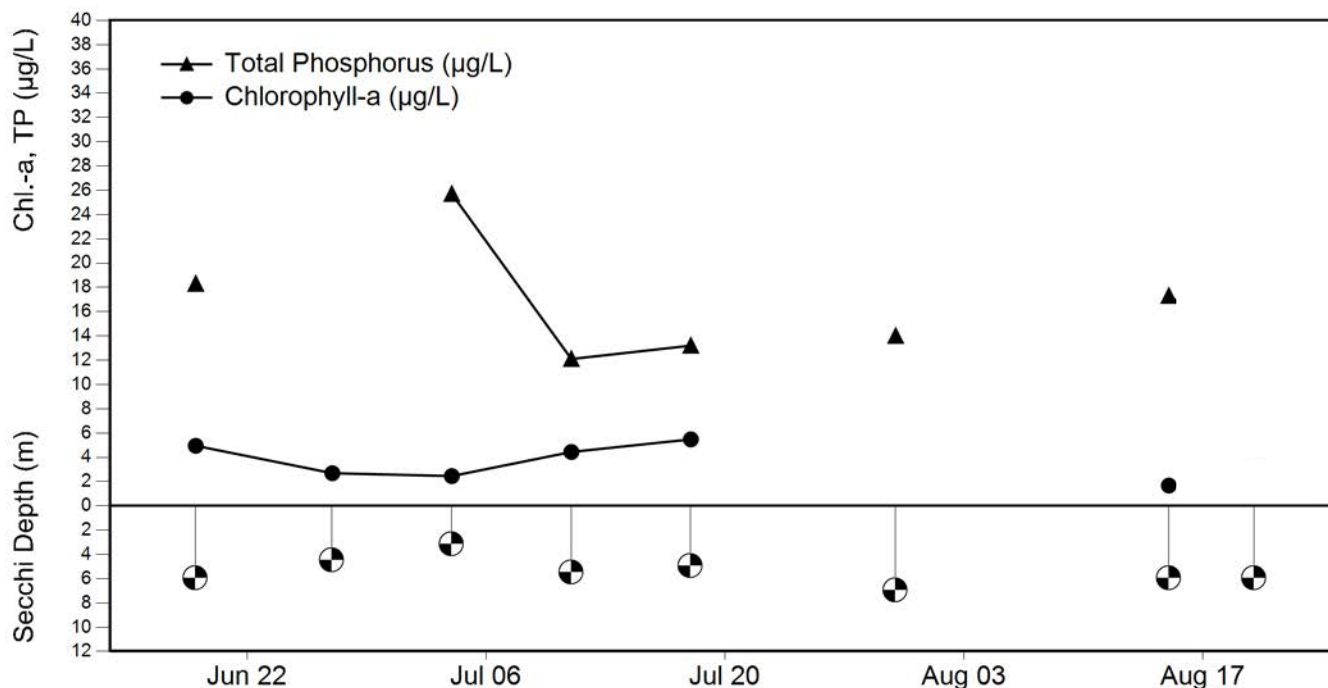
Longitude: 73° 14' 22.2" W

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	8	3.2	5.4	7.0
Chl-a (µg/L)	7	1.2	3.5	8.7
Summer TP (µg/L)	7	12.1	16.2	25.7



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



## NORTH BEACH

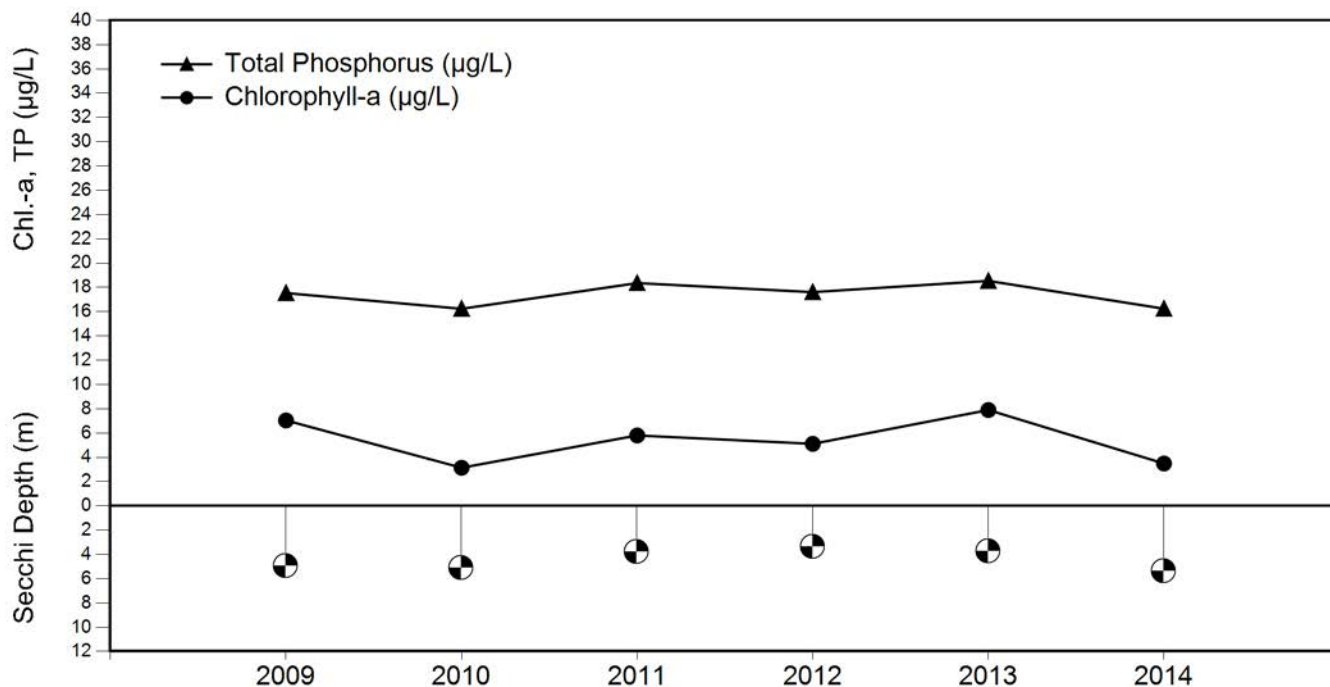
### Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a ( $\mu\text{g/l}$ )	Summer TP ( $\mu\text{g/l}$ )	Spring TP ( $\mu\text{g/l}$ )
2009	9	5.0	7.0	17.5	
2010	8	5.1	3.1	16.2	
2011	11	3.8	5.8	18.4	
2012	10	3.4	5.1	17.6	
2013	11	3.8	7.9	18.5	
2014	8	5.4			

Compared to other lake stations, the long-term summer means indicate:

Water clarity                      High  
 Algal population density      Low  
 Nutrient enrichment          High

### Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# QUENESKA ISLAND

## Lake Champlain Station #41

**Lay Monitor:** Kate Webb

### Location

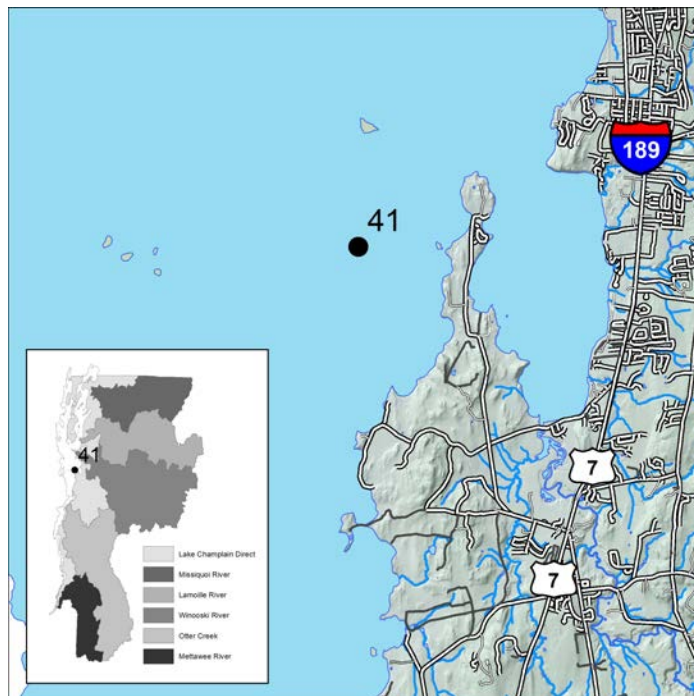
Station #41 is located off west Queneska Island, west of Shelburne Point in approximately 220 ft (67 m) of water.

Latitude: 44° 25' 45.98" N

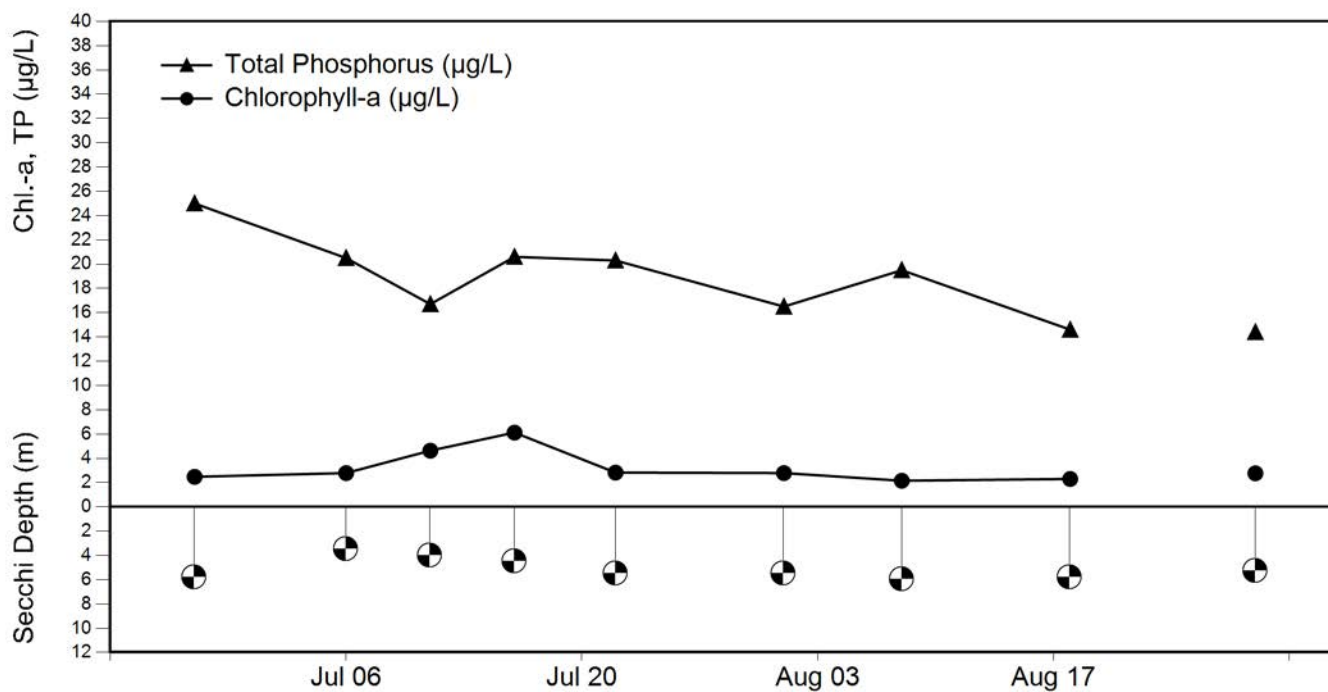
Longitude: 73° 16' 43" W

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	3.5	5.1	6.0
Chl-a (µg/L)	9	2.1	3.2	6.3
Summer TP (µg/L)	9	14.4	18.7	25.0



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



## QUENESKA ISLAND

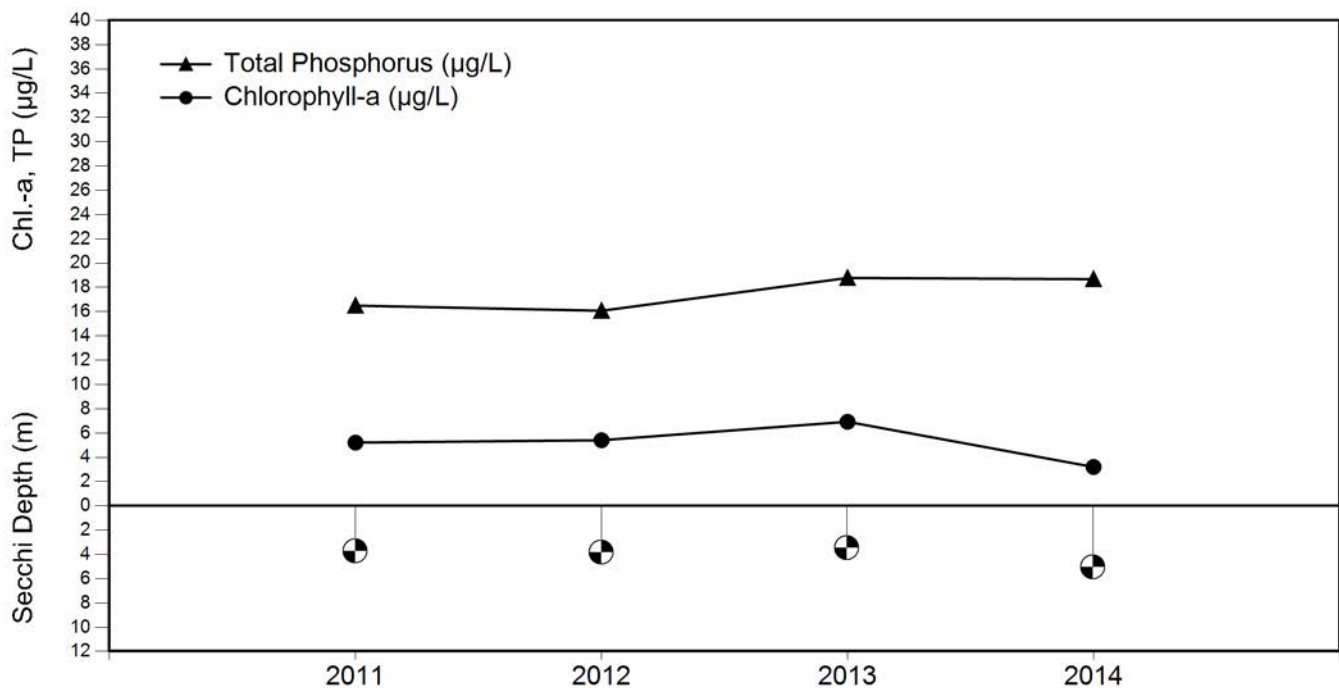
### Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a ( $\mu\text{g/l}$ )	Summer TP ( $\mu\text{g/l}$ )	Spring TP ( $\mu\text{g/l}$ )
2011	10	3.7	5.2	16.5	
2012	11	3.9	5.4	16.1	
2013	9	3.5	6.9	18.8	
2014	9	5.1	3.2	18.7	

**Compared to other lake stations, the long-term summer means indicate:**

Water clarity                      High  
 Algal population density      Low  
 Nutrient enrichment          High

**Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth**





# BEEBE POND

Hubbardton, VT

**Lay Monitor:** Barbara Cooley & Jody Zeoli  
**Former Lay Monitors:** Mary Sondergeld  
 Marilyn & Keith Brostek

## Physical

Beebe Pond is a small, warmwater lake.

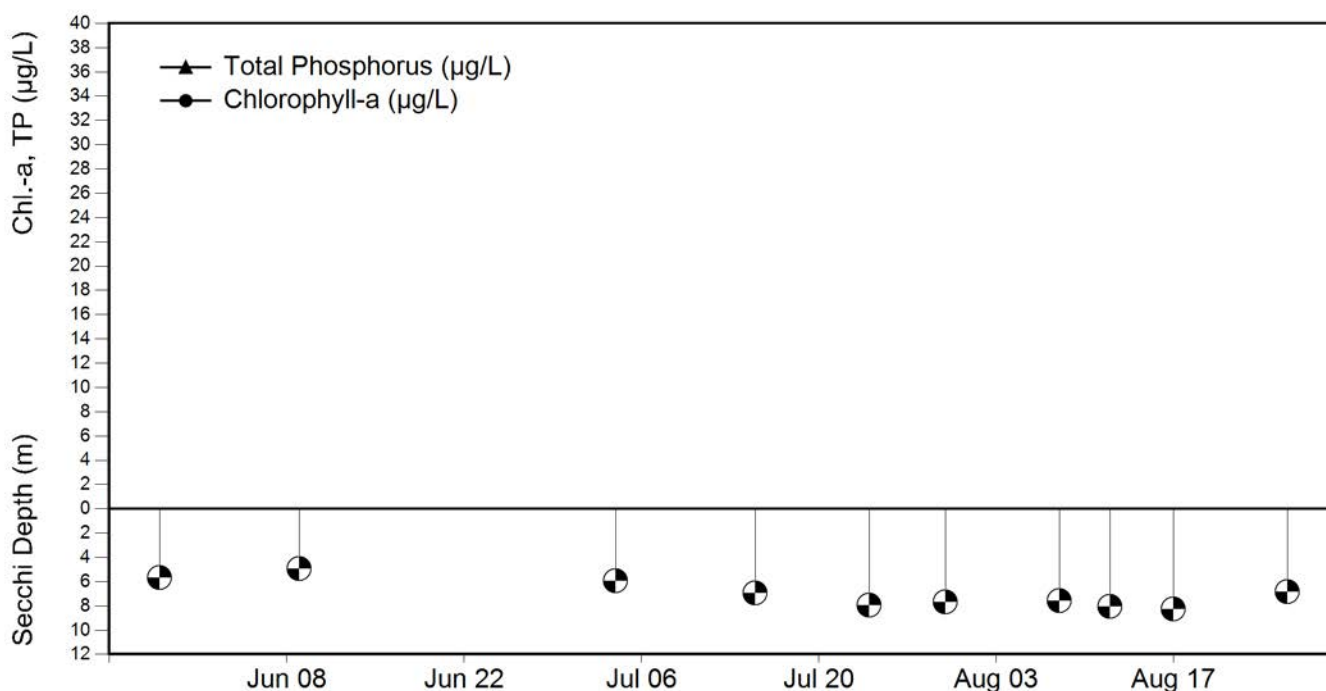
Lake Surface Area: 111 acres  
 Drainage Basin Area: 1,843 acres  
 Ratio (Basin:Lake): 17:1  
 Maximum Depth: 43 ft (13.1 m)  
 Mean Depth: 26 ft (7.9 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	10	5.0	7.1	8.3



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# BEEBE POND

## Annual Data

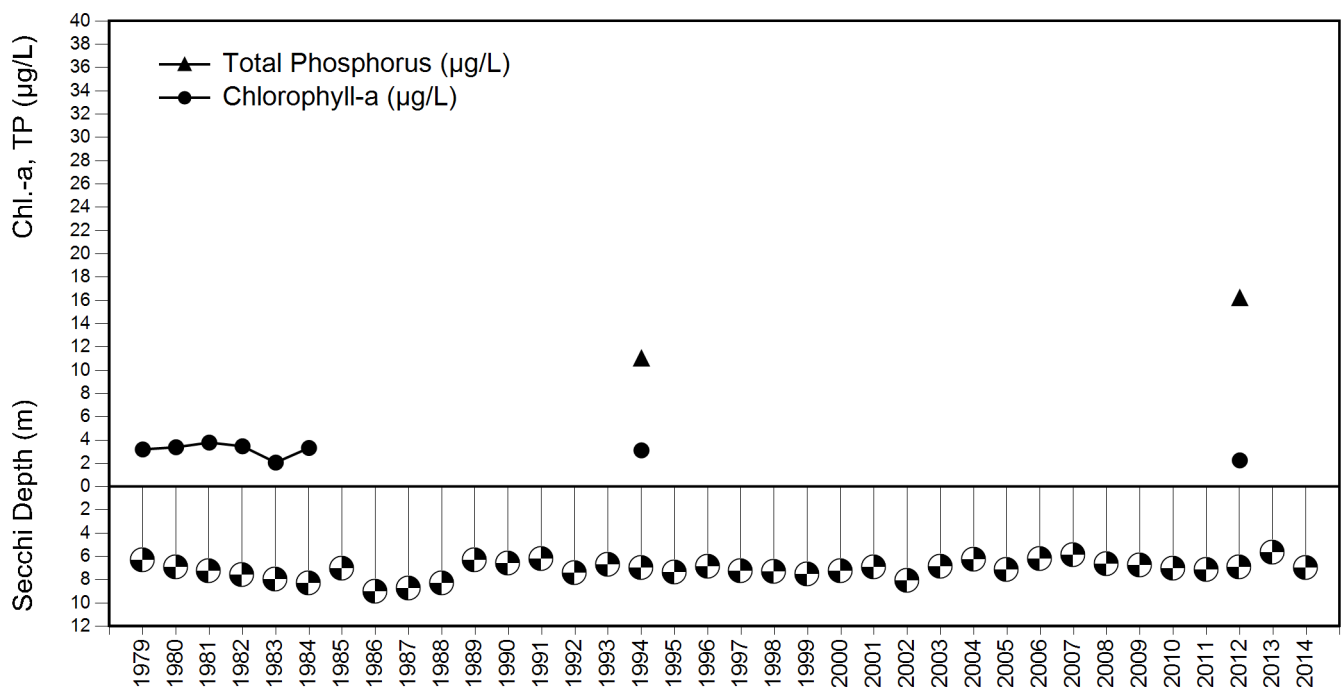
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	21	6.4	3.2		16.0
1980	13	7.0	3.4		14.0
1981	9	7.3	3.8		13.0
1982	8	7.6	3.5		18.0
1983	8	8.0	2.1		12.0
1984	9	8.3	3.3		9.0
1985	10	7.1			11.0
1986	8	9.0			26.0
1987	4	8.8			18.0
1988	8	8.3			
1989	7	6.4			
1990	7	6.6			
1991	7	6.3			
1992	10	7.4			
1993	8	6.7			
1994	12	7.0	3.1	11.0	18.7
1995	9	7.4			
1996	8	6.9			

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	9	7.3			
1998	6	7.3			13.3
1999	9	7.6			
2000	9	7.3			
2001	8	6.9			
2002	8	8.1			
2003	12	6.9			20.7
2004	8	6.3			22.0
2005	8	7.2			15.8
2006	9	6.2			14.6
2007	10	5.9			16.2
2008	7	6.7			
2009	11	6.8			
2010	12	7.1			
2011	9	7.2			
2012	9	7.0	2.3	16.2	14.9
2013	9	5.7			17.0
2014	10	7.0			

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# BIG POND (WOODFORD LAKE)

Woodford, VT

**Lay Monitor:** Maureen O'Neil  
**Former Lay Monitors:** Dorothy Cleary  
 Anita Capella

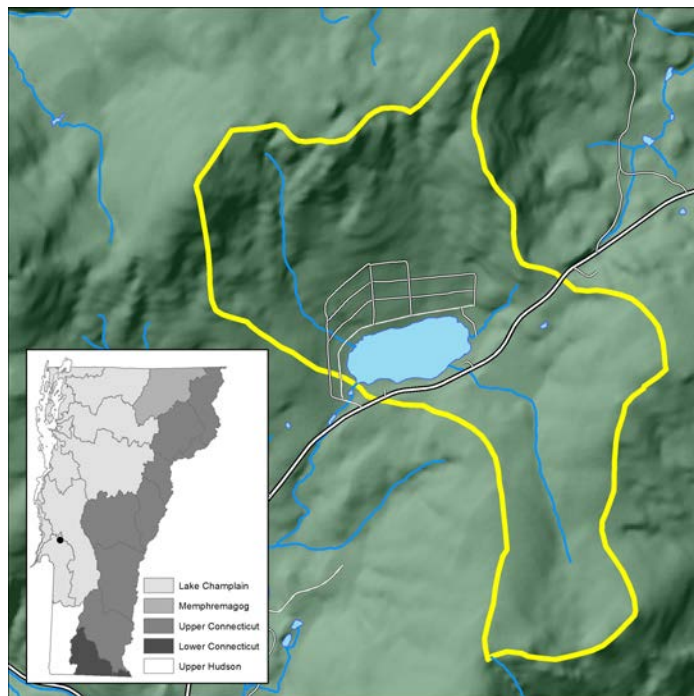
## Physical

Big Pond is a small, warmwater lake.

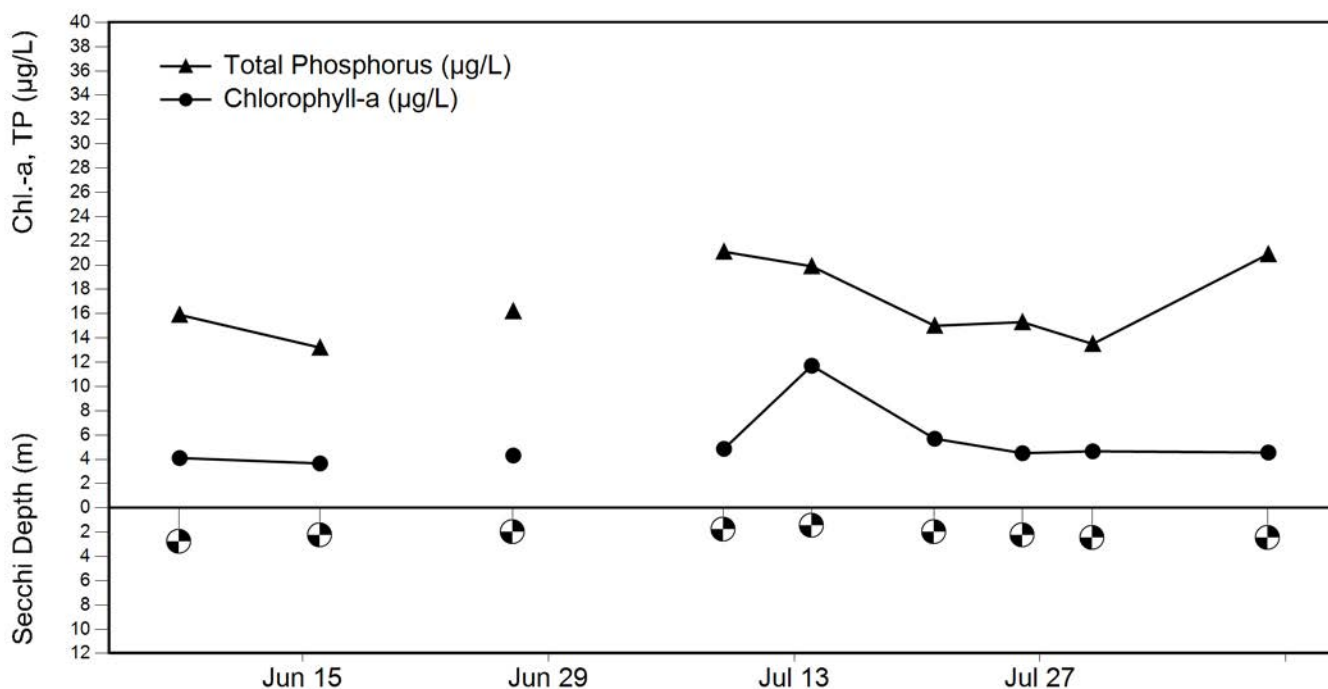
Lake Surface Area: 31 acres  
 Drainage Basin Area: 715 acres  
 Ratio (Basin:Lake): 23:1  
 Maximum Depth: 28 ft (8.5 m)  
 Mean Depth: 13 ft (4.0 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	10	1.5	2.3	3.0
Chl-a ( $\mu\text{g/L}$ )	9	3.3	5.3	12.4
Summer TP ( $\mu\text{g/L}$ )	9	13.2	16.8	21.1



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



## BIG POND (WOODFORD LAKE)

### Annual Data

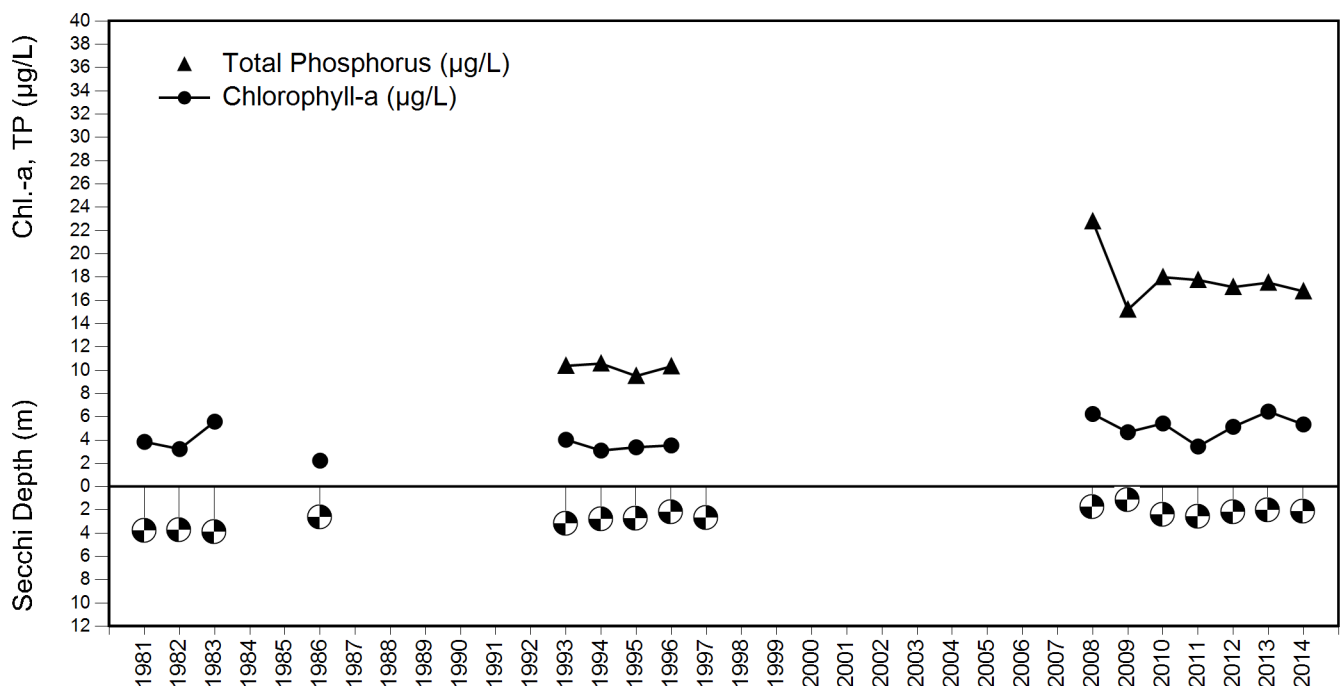
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1981	13	3.8	3.8		
1982	13	3.8	3.2		7.0
1983	10	3.9	5.6		9.0
1986	10	2.7	2.2		
1993	8	3.2	4.0	10.4	
1994	7	2.8	3.1	10.6	
1995	10	2.8	3.4	9.5	
1996	7	2.2	3.5	10.3	
1992					10.0
1984					7.0
1979					7.0

### Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	8	2.7			11.7
2000					16.7
2007					9.6
2008	8	1.8	6.2	22.8	11.1
2009	1	1.2	4.7	15.2	
2010	12	2.4	5.4	18.0	
2011	10	2.6	3.4	17.7	
2012	9	2.2	5.1	17.1	
2013	9	2.1	6.4	17.5	
2014	9	2.2	5.3	16.8	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

### Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE BOMOSEEN

## Castleton and Hubbardton, VT

**Lay Monitor:** Frank Giannini  
**Former Lay Monitors:** Alfred S Kosloffsky  
 Jim & Kathy Leamy

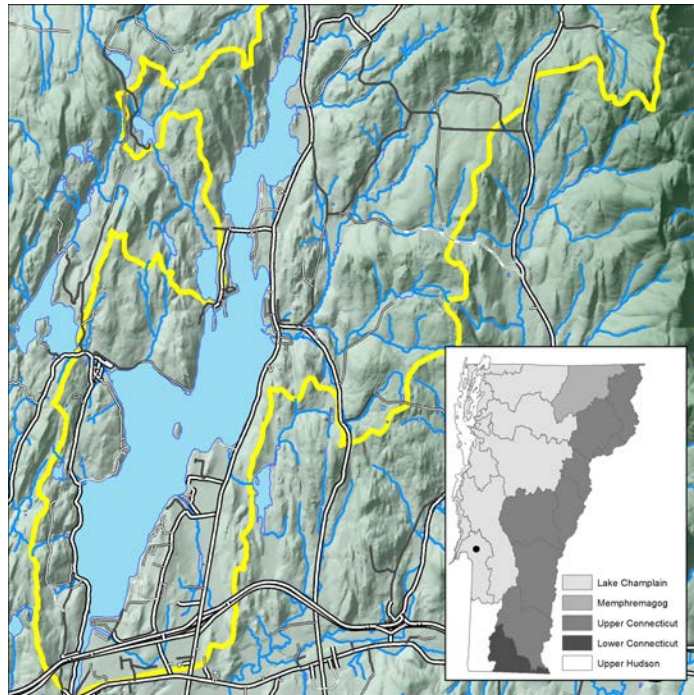
### Physical

Lake Bomoseen is a large, warmwater lake.

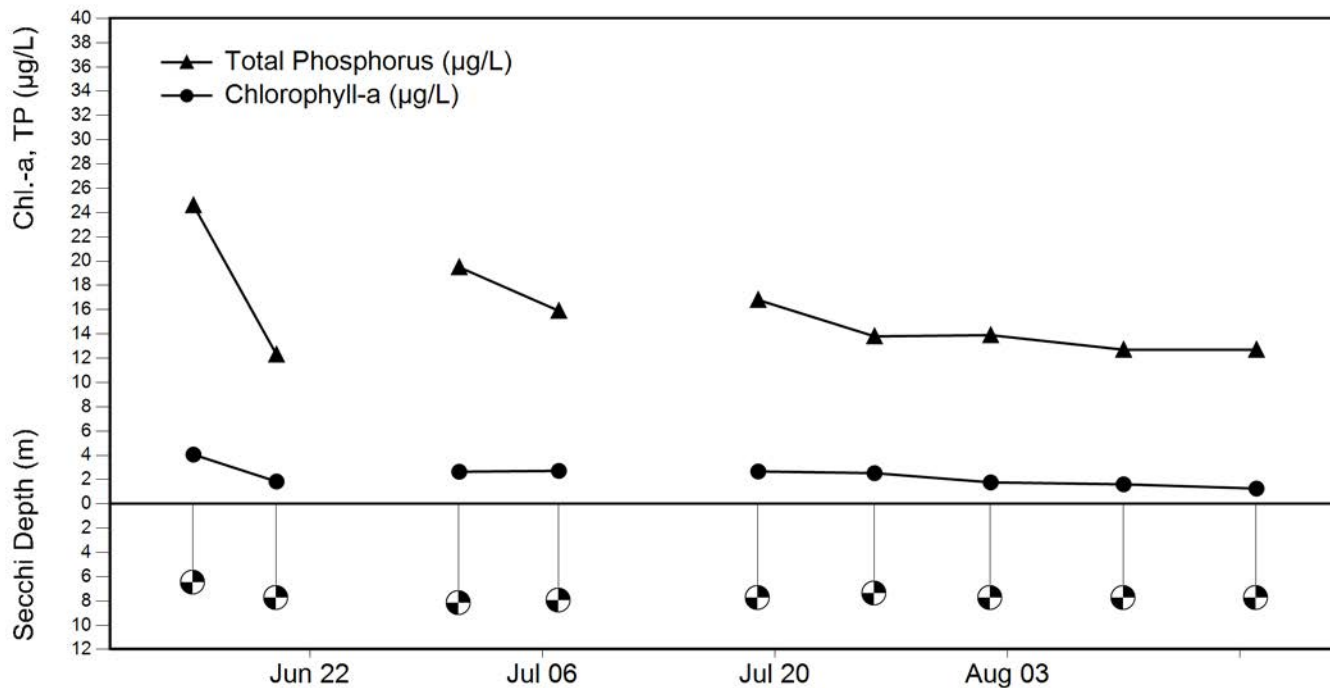
Lake Surface Area: 2,360 acres  
 Drainage Basin Area: 23,630 acres  
 Ratio (Basin:Lake): 10:1  
 Maximum Depth: 65 ft (19.8 m)  
 Mean Depth: 27 ft (8.2 m)

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	6.5	7.7	8.2
Chl-a ( $\mu\text{g/L}$ )	9	0.6	2.3	4.3
Summer TP ( $\mu\text{g/L}$ )	9	12.3	15.8	24.6



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# LAKE BOMOSEEN

## Annual Data

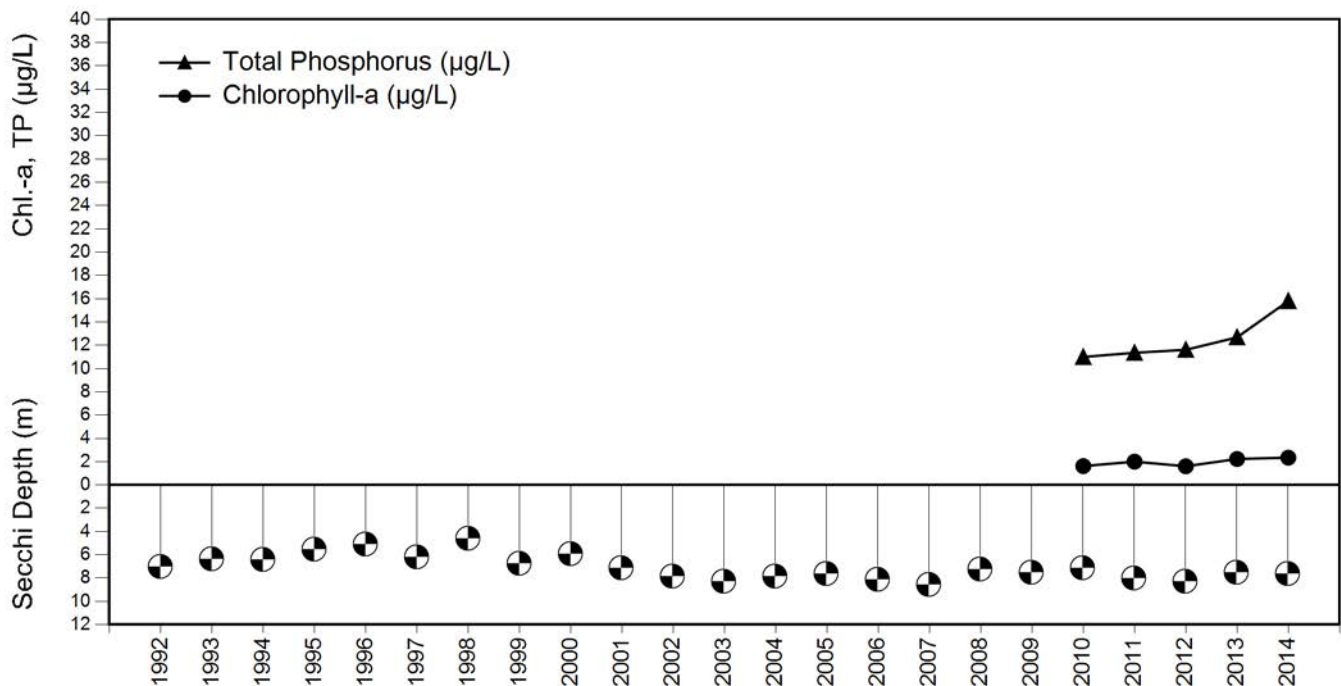
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1992	11	7.1			
1993	12	6.4			
1994	11	6.5			
1995	11	5.6			11.3
1996	11	5.2			13.7
1982					20.0
1984					13.0
1980					9.0
1985					16.0
1987					11.0
1983					19.0
1986					14.0
1979					19.0
1981					21.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	13	6.2			
1998	13	4.6			15.3
1999	13	6.8			
2000	12	6.0			
2001	9	7.2			
2002	11	7.9			
2003	13	8.3			
2004	12	7.9			13.0
2005	14	7.7			
2006	13	8.2			
2007	10	8.6			8.0
2008	11	7.3			12.0
2009	9	7.6			
2010	10	7.2	1.6	11.0	
2011	11	8.1	2.0	11.4	9.9
2012	10	8.4	1.6	11.6	
2013	10	7.6	2.2	12.7	
2014	9	7.7	2.3	15.8	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE CARMi

Franklin, VT

**Lay Monitor:** Peter Benevento  
**Former Lay** Bob Rennie  
**Monitors:** Skyler Gauvin  
 Dave Jones  
 Richard Davis

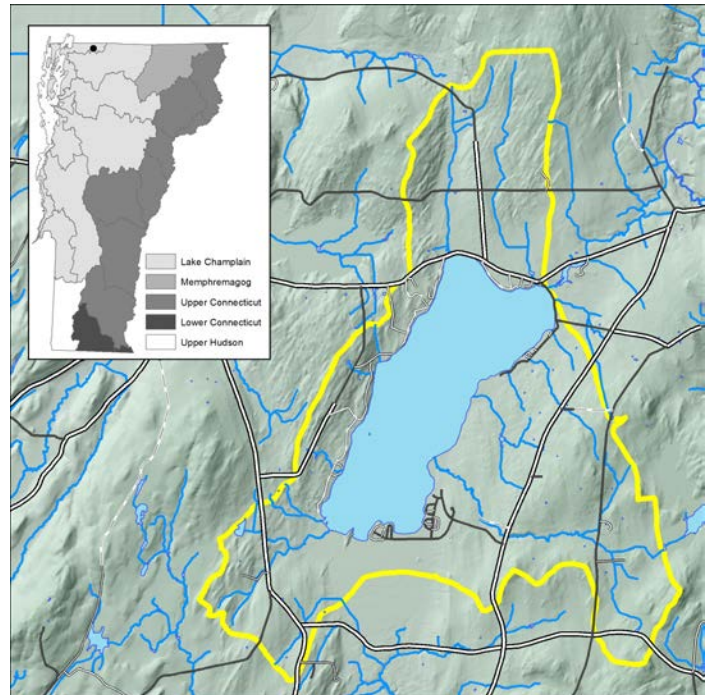
## Physical

Lake Carmi is a large, shallow, warmwater lake.

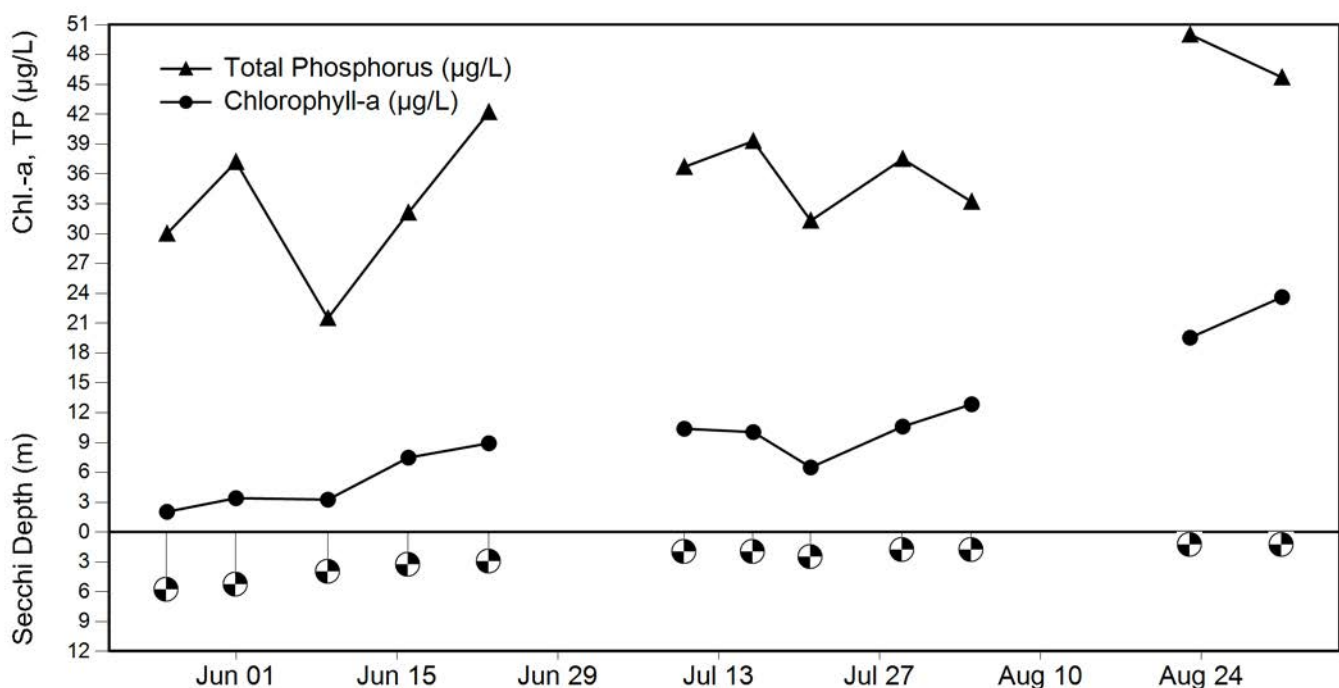
Lake Surface Area: 1,402 acres  
 Drainage Basin Area: 7,710 acres  
 Ratio (Basin:Lake): 6:1  
 Maximum Depth: 33 ft (10.1 m)  
 Mean Depth: 13 ft (4.0 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	12	1.3	2.9	5.8
Chl-a ( $\mu\text{g/L}$ )	12	2.0	9.9	23.8
Summer TP ( $\mu\text{g/L}$ )	12	21.5	36.4	50.0
Spring TP ( $\mu\text{g/L}$ )	1		30.9	



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE CARMI

## Annual Data

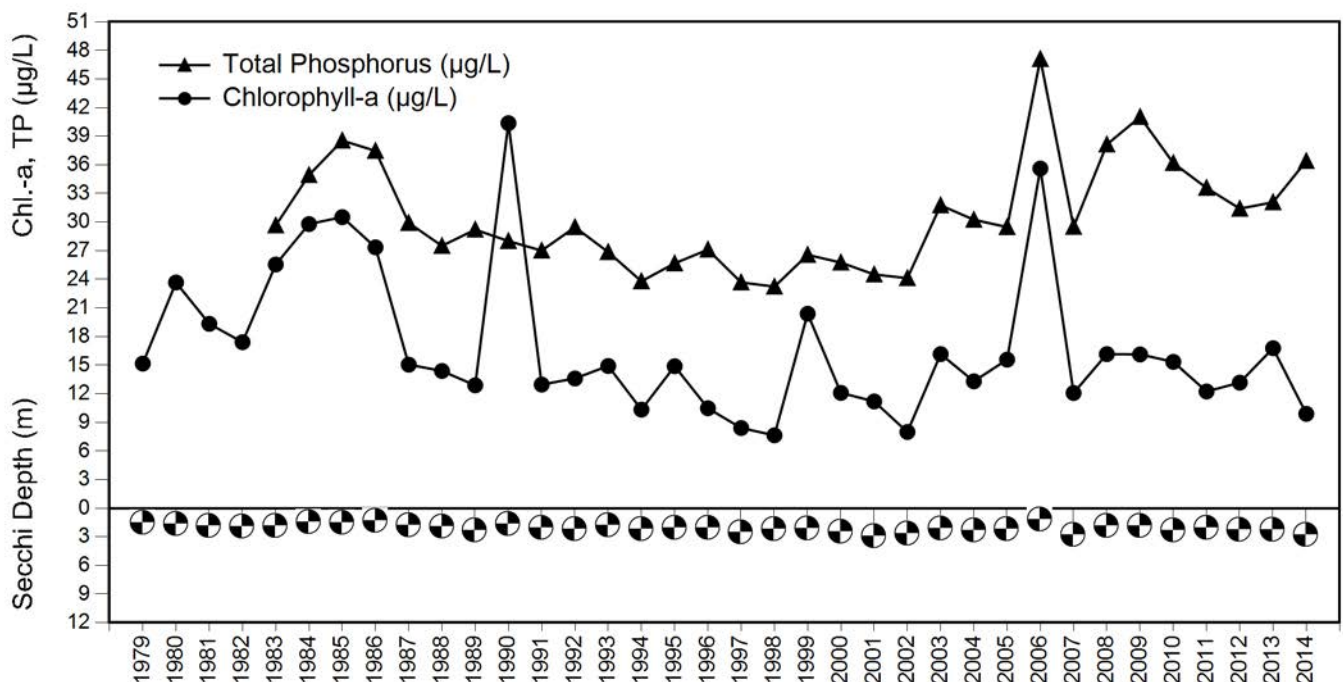
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	24	1.5	15.2		18.0
1980	16	1.7	23.7		
1981	12	1.9	19.3		21.0
1982	7	1.9	17.4		31.0
1983	11	1.9	25.5	29.6	33.0
1984	12	1.5	29.8	34.9	27.0
1985	13	1.5	30.5	38.5	28.0
1986	13	1.3	27.3	37.5	22.0
1987	10	1.8	15.0	29.9	30.0
1988	13	2.0	14.4	27.5	
1989	13	2.4	12.9	29.2	
1990	17	1.7	40.4	28.0	
1991	12	2.1	13.0	27.0	
1992	13	2.2	13.6	29.5	
1993	14	1.8	14.9	26.8	
1994	14	2.2	10.3	23.8	27.3
1995	10	2.1	14.9	25.7	23.0
1996	10	2.1	10.5	27.1	27.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	9	2.5	8.4	23.7	29.0
1998	9	2.2	7.6	23.2	26.3
1999	9	2.1	20.4	26.6	26.3
2000	8	2.5	12.1	25.8	26.3
2001	14	2.9	11.2	24.5	26.3
2002	9	2.7	8.0	24.1	22.3
2003	8	2.2	16.2	31.8	
2004	11	2.3	13.3	30.2	30.3
2005	11	2.2	15.6	29.5	
2006	10	1.2	35.6	47.1	
2007	12	2.8	12.1	29.5	22.4
2008	12	1.9	16.2	38.1	
2009	13	1.9	16.1	41.0	34.4
2010	13	2.4	15.3	36.2	
2011	12	2.1	12.2	33.6	
2012	12	2.3	13.2	31.4	27.9
2013	12	2.3	16.8	32.1	33.9
2014	12	2.8	9.9	36.4	30.9

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# CASPIAN LAKE

Greensboro, VT

**Lay Monitor:** Andy Dales  
**Former Lay** George Hasen  
**Monitors:** Scott Irwin  
 Kimball Igleheart

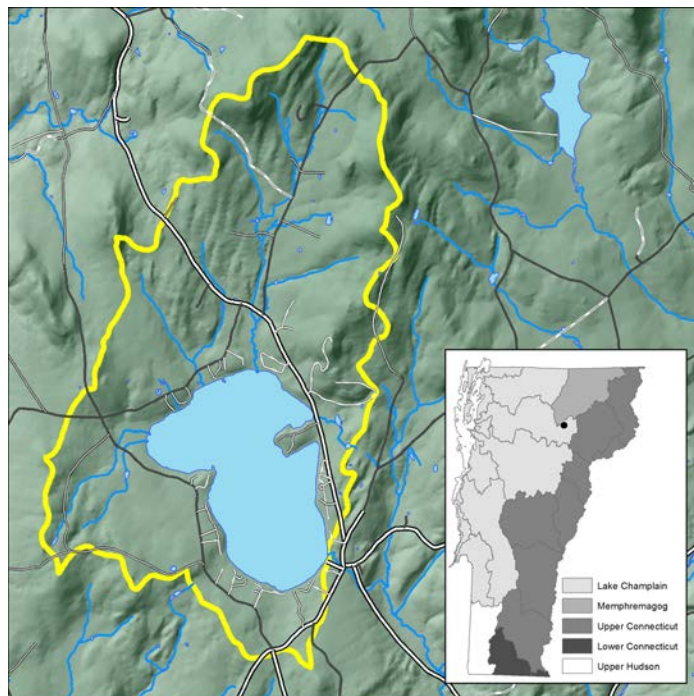
## Physical

Caspian Lake is a large, deep, coldwater lake.

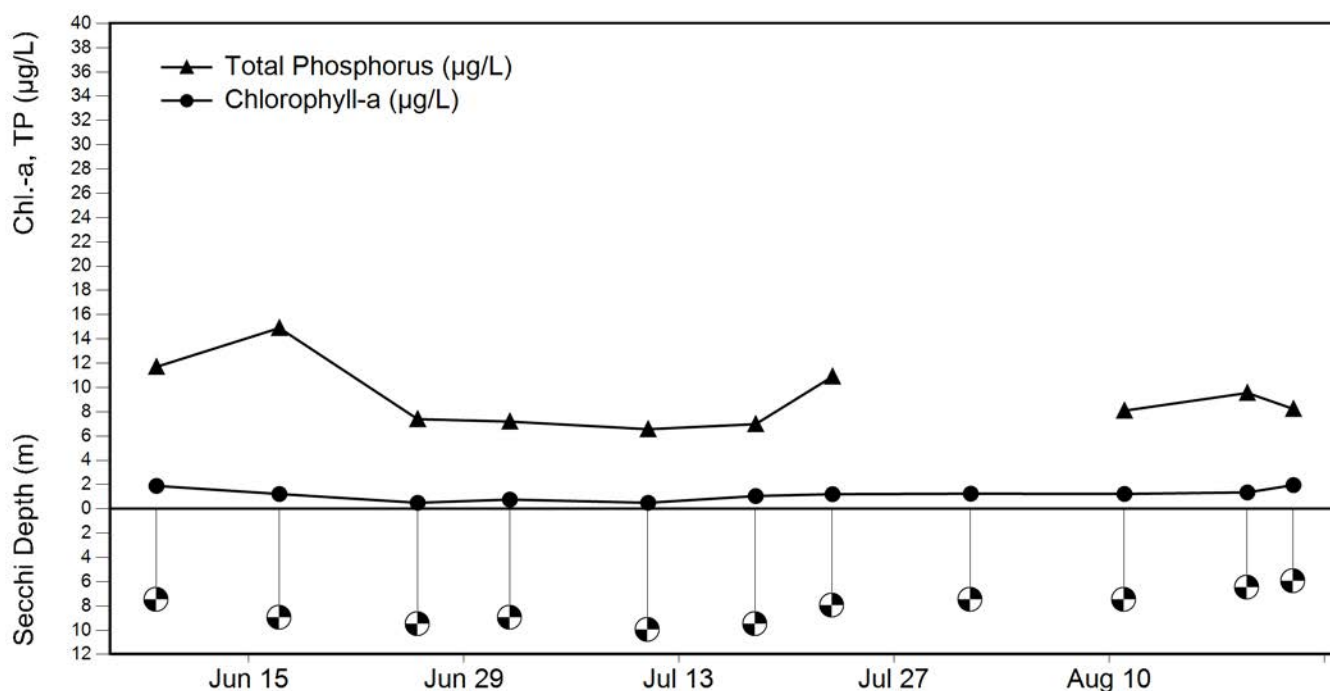
Lake Surface Area: 789 acres  
 Drainage Basin Area: 4,510 acres  
 Ratio (Basin:Lake): 6:1  
 Maximum Depth: 142 ft (43.3 m)  
 Mean Depth: 57 ft (17.4 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	11	6.0	8.4	10.0
Chl-a ( $\mu\text{g/L}$ )	11	0.5	1.1	2.0
Summer TP ( $\mu\text{g/L}$ )	10	6.6	9.1	14.9



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# CASPIAN LAKE

## Annual Data

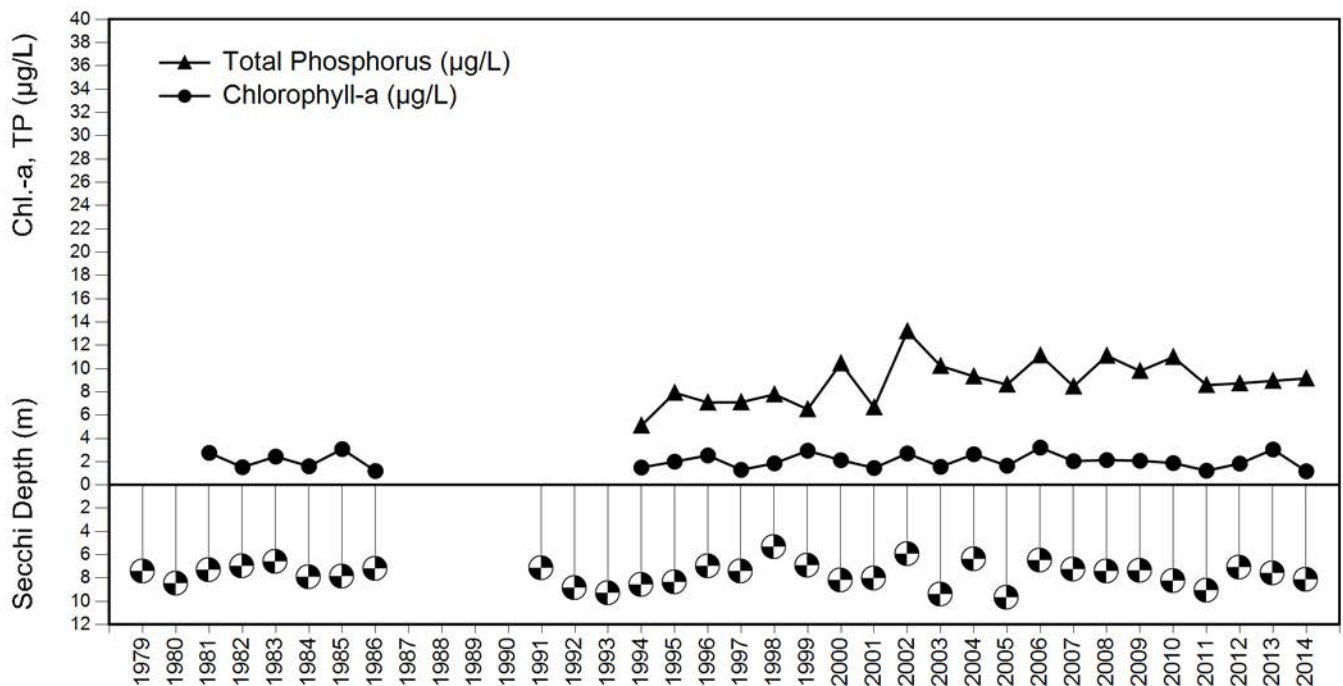
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	7	7.4			5.0
1980	9	8.5			6.0
1981	13	7.3	2.8		5.0
1982	12	7.0	1.5		7.0
1983	11	6.6	2.4		7.0
1984	12	7.9	1.6		6.0
1985	13	7.9	3.1		8.0
1986	12	7.3	1.2		9.0
1991	12	7.2			
1992	13	8.9			
1993	11	9.3			
1994	13	8.6	1.5	5.1	5.3
1995	12	8.4	2.0	7.9	
1996	12	7.0	2.5	7.1	4.3
1987					6.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	10	7.5	1.3	7.1	6.3
1998	10	5.3	1.9	7.8	
1999	10	7.0	2.9	6.5	5.7
2000	10	8.2	2.1	10.4	
2001	10	8.1	1.5	6.7	
2002	10	6.0	2.7	13.2	
2003	14	9.4	1.6	10.2	
2004	14	6.4	2.6	9.3	
2005	13	9.7	1.7	8.6	7.6
2006	11	6.5	3.2	11.1	9.6
2007	12	7.3	2.0	8.5	8.1
2008	12	7.4	2.1	11.1	8.1
2009	14	7.4	2.1	9.8	
2010	11	8.3	1.9	11.0	
2011	12	9.1	1.2	8.6	
2012	12	7.1	1.8	8.7	
2013	12	7.6	3.0	8.9	
2014	11	8.2	1.2	9.1	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# CHIPMAN LAKE

Tinmouth, VT

**Lay Monitors:** Annie Robbins &  
Joe Frankiewicz

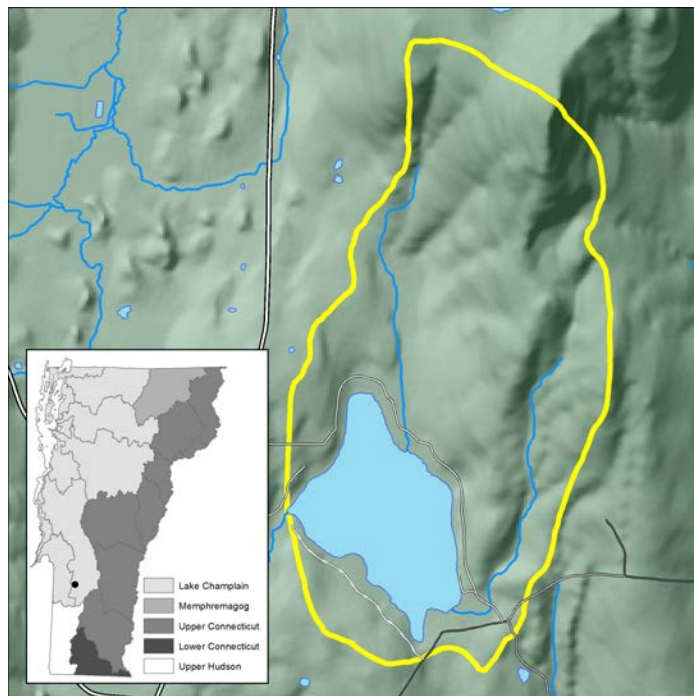
## Physical

Chipman Lake is a small, shallow lake.

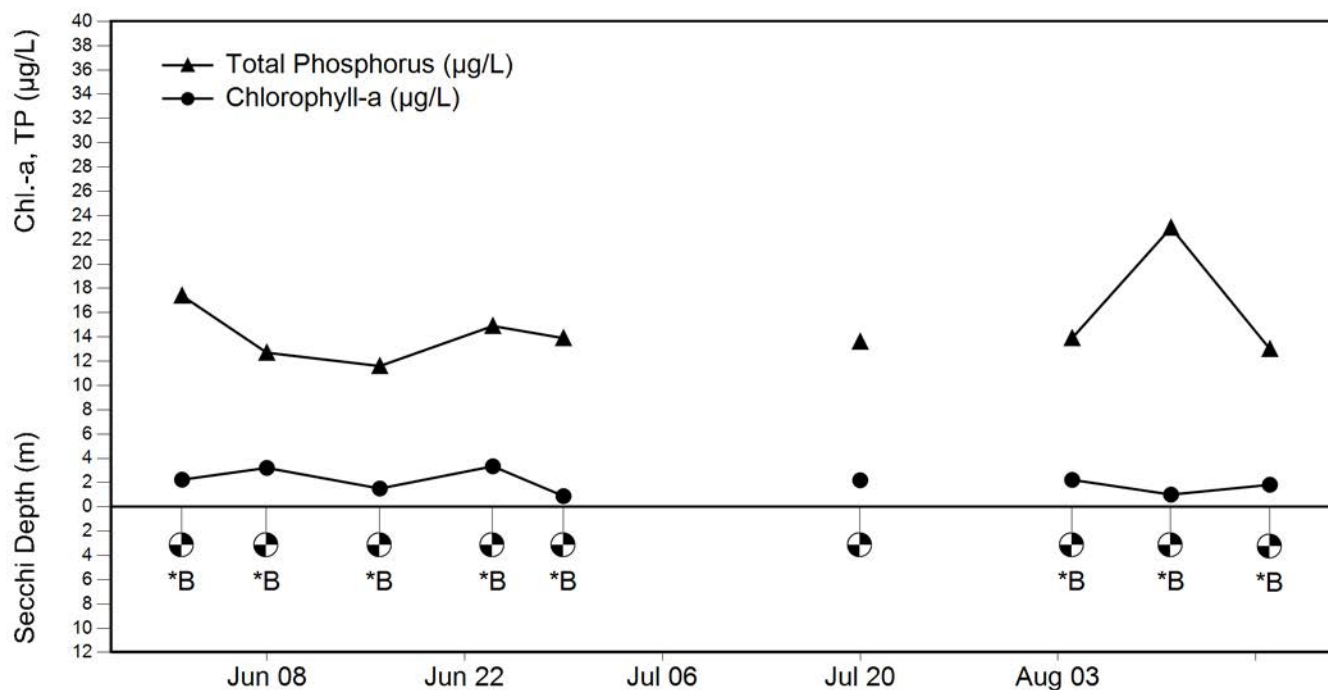
Lake Surface Area: 79 acres  
Drainage Basin Area: 535 acres  
Ratio (Basin:Lake): 7:1  
Maximum Depth: 11 ft (3.4 m)  
Mean Depth: 7 ft (2.1 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m) *B	9	3.2	3.2	3.3
Chl-a ( $\mu\text{g/L}$ )	9	0.9	2.1	3.3
Summer TP ( $\mu\text{g/L}$ )	9	11.6	14.9	23.0



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# CHIPMAN LAKE

## Annual Data

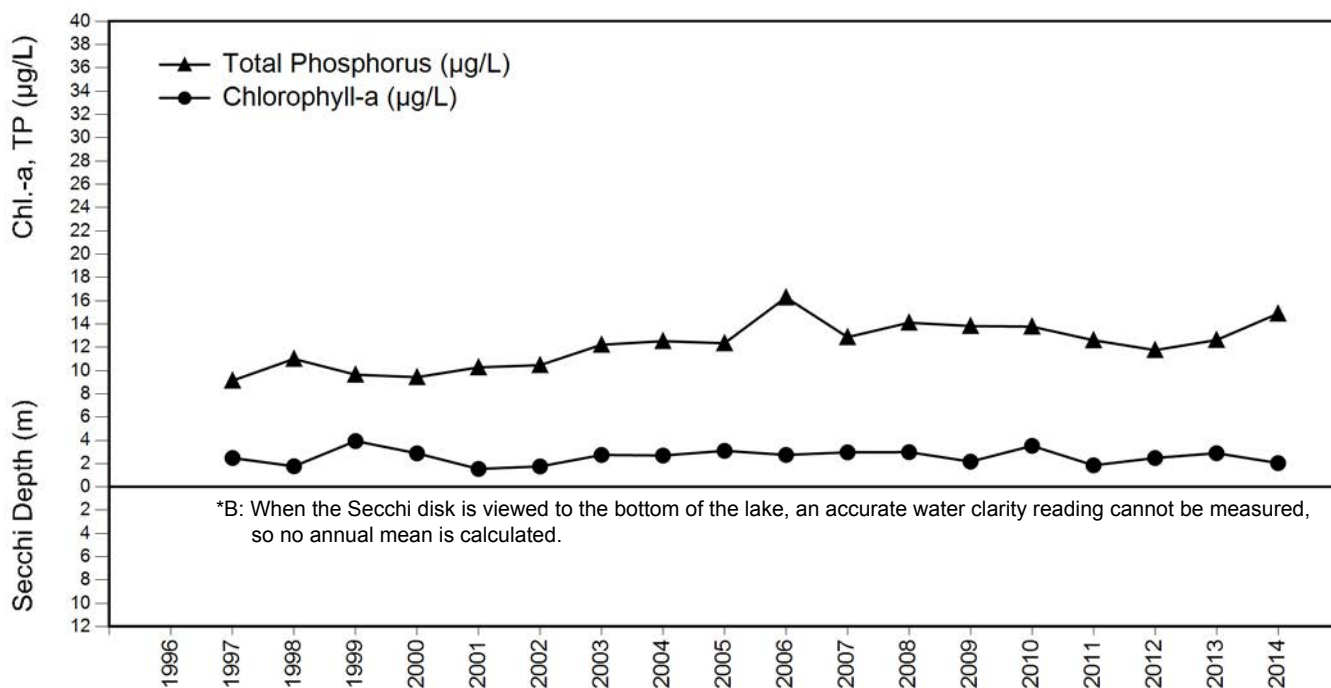
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1996	11	*B			
1979					10.0
1995					6.7

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	15	*B	2.5	9.1	18.3
1998	15	*B	1.8	11.0	
1999	14	*B	3.9	9.6	8.0
2000	14	*B	2.9	9.4	
2001	11	*B	1.5	10.3	5.0
2002	13	*B	1.8	10.5	
2003	14	*B	2.7	12.2	
2004	13	*B	2.7	12.5	
2005	12	*B	3.1	12.3	14.3
2006	14	*B	2.7	16.3	
2007	12	*B	3.0	12.9	
2008	12	*B	3.0	14.1	
2009	12	*B	2.2	13.8	
2010	11	*B	3.5	13.8	
2011	15	*B	1.9	12.6	9.8
2012	14	*B	2.5	11.8	
2013	10	*B	2.9	12.6	
2014	9	*B	2.0	14.9	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# COLE POND

Jamaica, VT

Lay Monitors: Sherry & Vaughn Clark

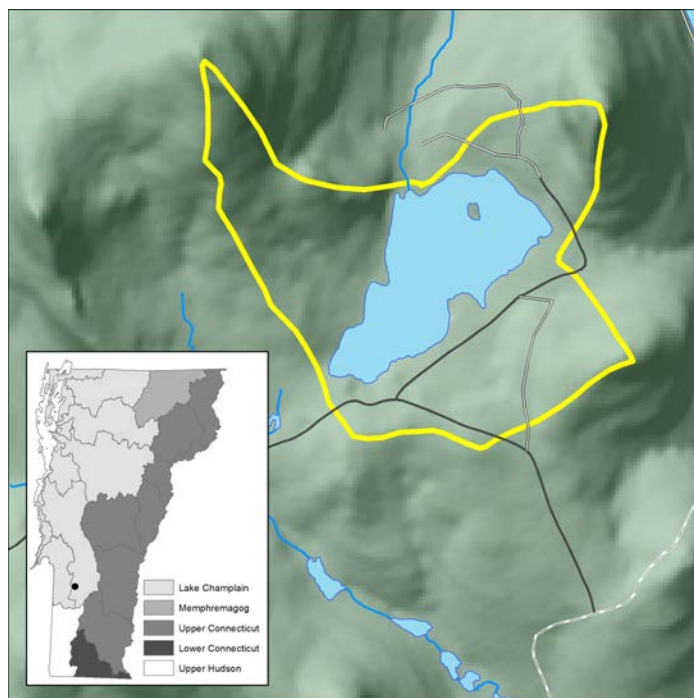
## Physical

Cole Pond is a fairly remote, small, shallow lake.

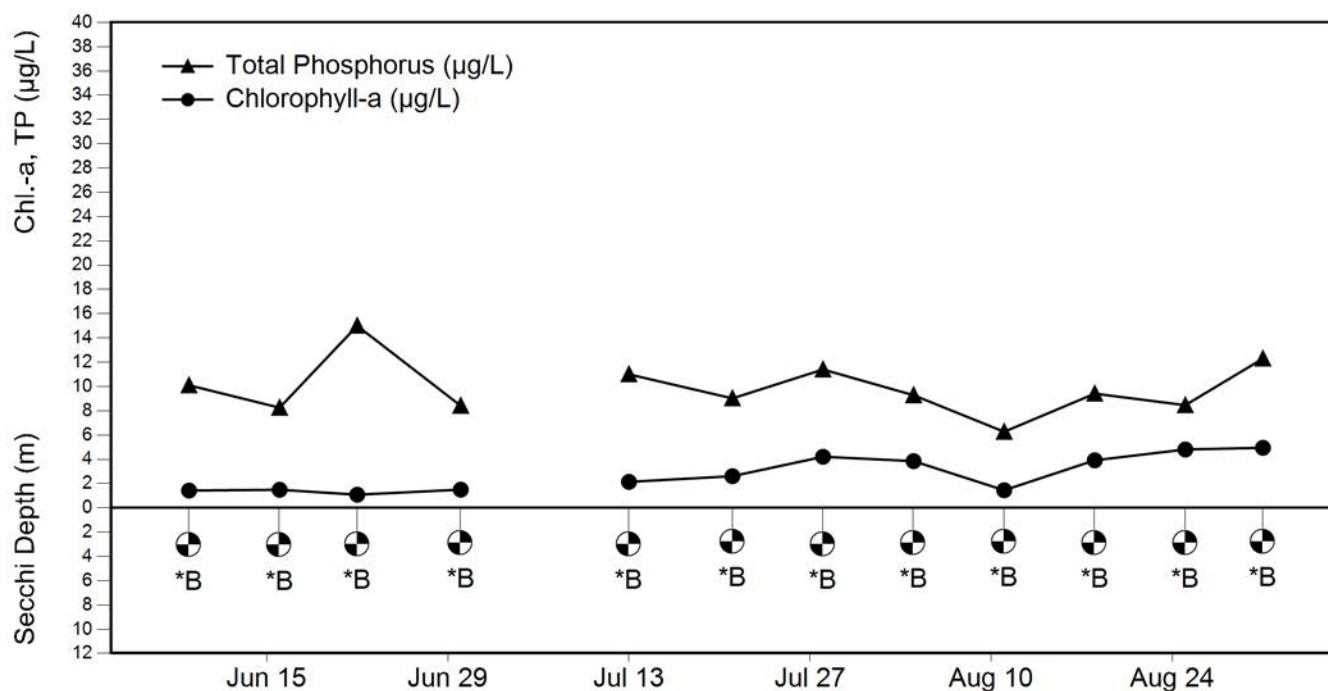
Lake Surface Area: 41 acres  
 Drainage Basin Area: 282 acres  
 Ratio (Basin:Lake): 7:1  
 Maximum Depth: 13 ft (4.0 m)  
 Mean Depth: 5 ft (1.5 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m) *B	12	2.8	3.4	4.1
Chl-a (µg/L)	12	1.0	2.8	6.7
Summer TP (µg/L)	12	6.3	9.9	15.0



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# COLE POND

## Annual Data

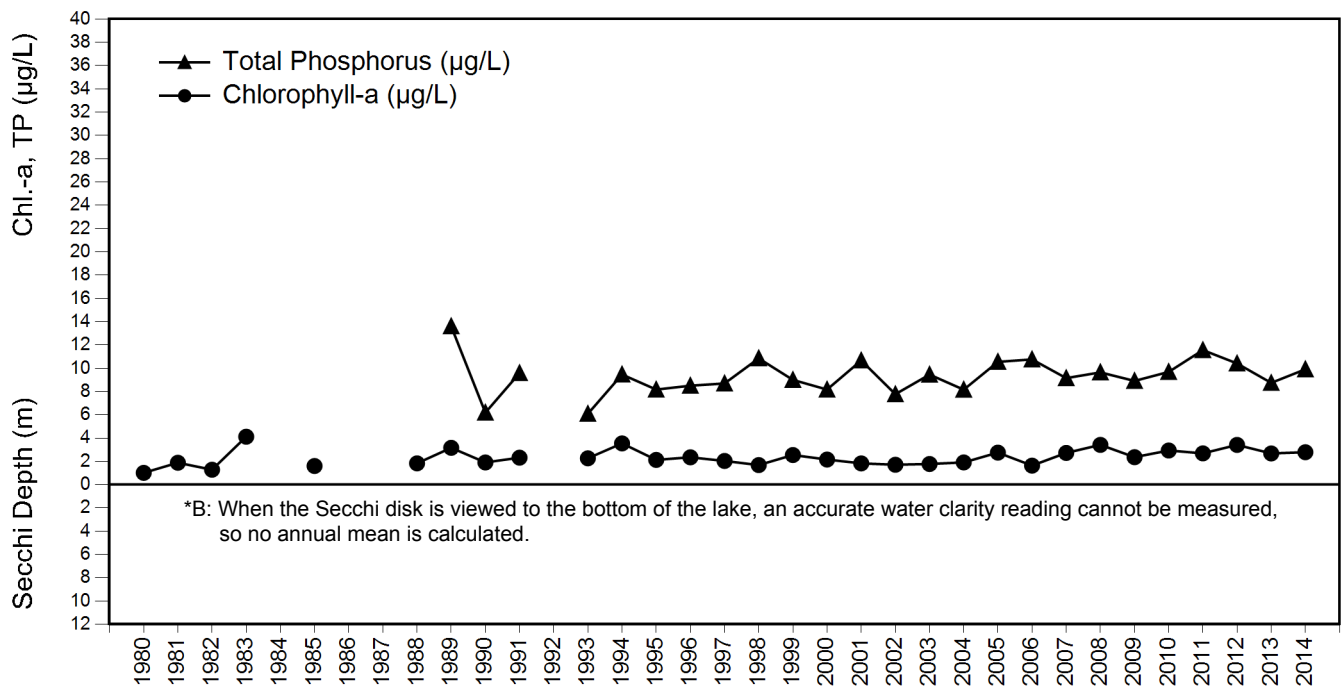
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1980	13	*B	1.0		
1981	13	*B	1.9		6.0
1982	11	*B	1.3		
1983	9	*B	4.1		7.0
1985	11	*B	1.6		
1988	8	*B	1.8		
1989	10	*B	3.2	13.6	12.0
1990	12	*B	1.9	6.2	
1991	12	*B	2.3	9.6	
1992	13	*B			
1993	12	*B	2.3	6.1	
1994	13	*B	3.5	9.5	
1995	12	*B	2.1	8.2	6.0
1996	13	*B	2.3	8.5	9.7
1984					7.0
1986					12.0
1979					6.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	13	*B	2.0	8.7	
1998	13	*B	1.7	10.8	7.3
1999	12	*B	2.5	9.0	
2000	12	*B	2.2	8.2	9.0
2001	13	*B	1.8	10.7	
2002	13	*B	1.7	7.8	
2003	12	*B	1.8	9.5	
2004	12	*B	1.9	8.2	
2005	11	*B	2.8	10.5	
2006	11	*B	1.6	10.8	13.1
2007	11	*B	2.7	9.2	
2008	11	*B	3.4	9.6	
2009	12	*B	2.4	8.9	
2010	12	*B	2.9	9.7	
2011	11	*B	2.7	11.6	9.0
2012	12	*B	3.4	10.4	
2013	12	*B	2.7	8.7	
2014	12	*B	2.8	9.9	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# COLES POND

## Stannard and Walden, VT

**Lay Monitor:** Judy Dunnan  
**Former Lay Monitors:** Joseph Engel  
 Samantha Lavertue

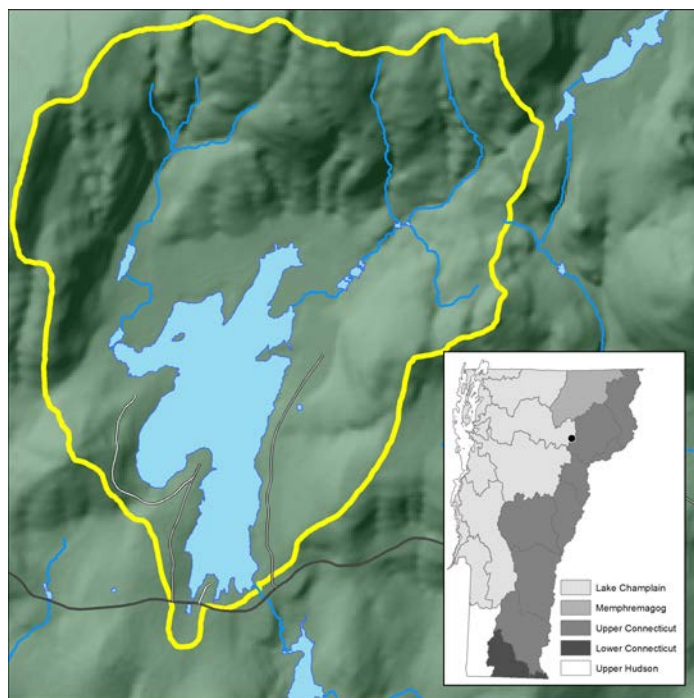
### Physical

Coles Pond is a moderately sized, shallow, natural lake with artificial controls.

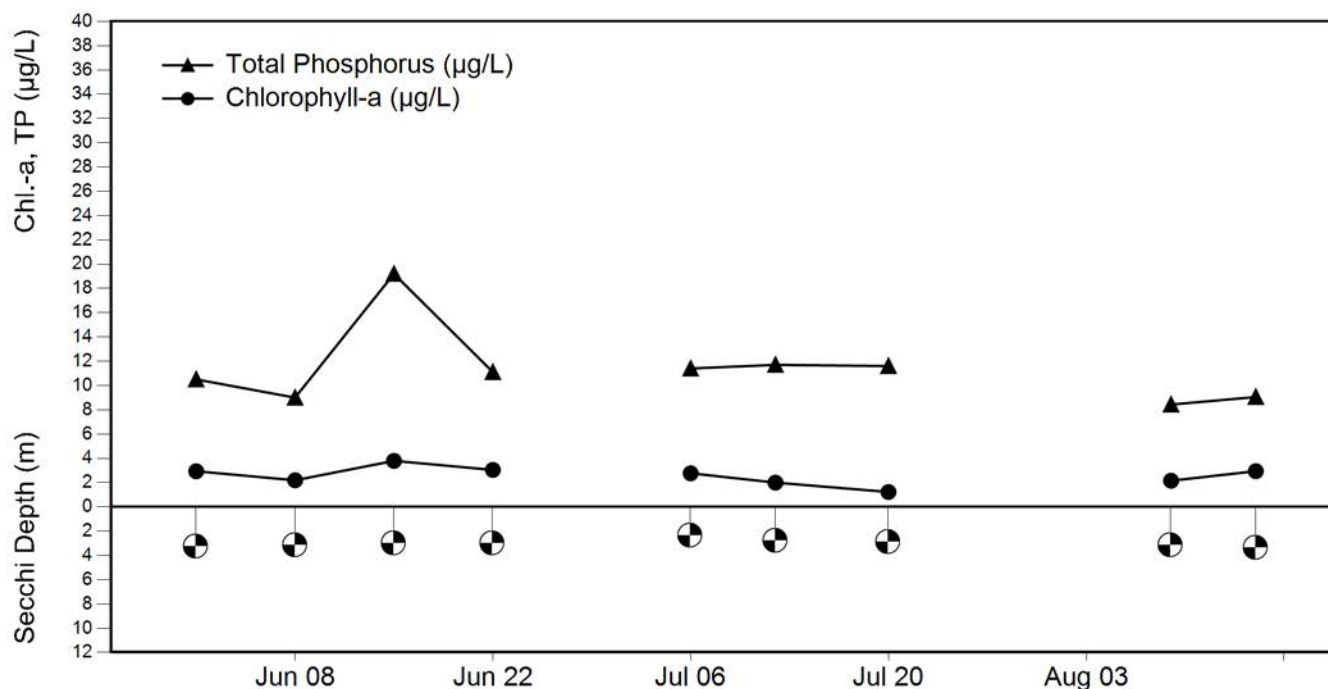
Lake Surface Area: 125 acres  
 Drainage Basin Area: 744 acres  
 Ratio (Basin:Lake): 6:1  
 Maximum Depth: 21 ft (6.4 m)  
 Mean Depth: 8 ft (2.4 m)

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	2.4	3.0	3.4
Chl-a ( $\mu\text{g/L}$ )	9	1.0	2.6	3.8
Summer TP ( $\mu\text{g/L}$ )	9	8.4	11.3	19.2



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# COLES POND

## Annual Data

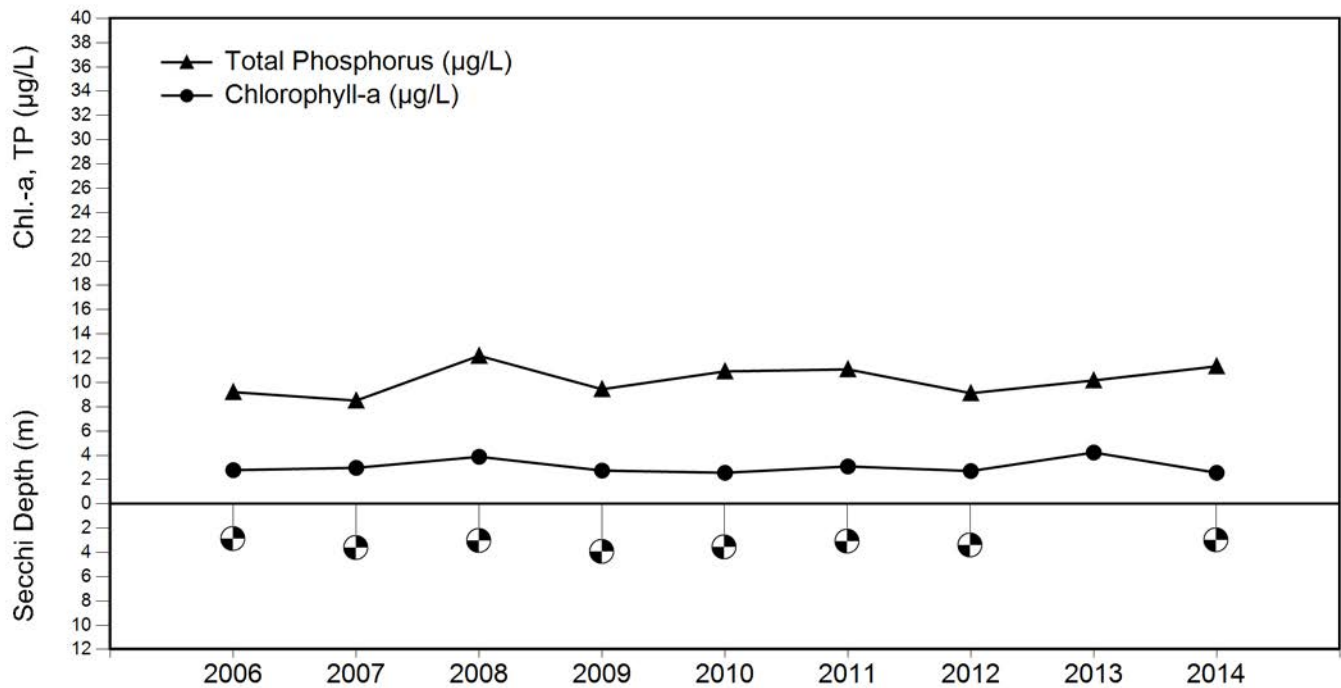
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1990					9.0
1988					9.0
1979					6.0
1989					14.0
1987					8.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997					6.7
1999					8.0
2005					8.7
2006	12	2.9	2.8	9.2	
2007	12	3.7	3.0	8.5	
2008	12	3.1	3.9	12.2	
2009	13	4.0	2.7	9.4	
2010	13	3.6	2.6	10.9	8.9
2011	12	3.1	3.1	11.1	
2012	11	3.4	2.7	9.1	
2013	12	*B	4.2	10.2	
2014	9	3.0	2.6	11.3	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# CURTIS POND

Calais, VT

**Lay Monitor:** Colleen Bloom

**Former Lay** Andrea & Doug

**Monitors:** Triguba-Braasch  
Lucille & Alexander  
MacLellan

## Physical

Curtis Pond is a small, warmwater lake.

Lake Surface Area: 72 acres

Drainage Basin Area: 917 acres

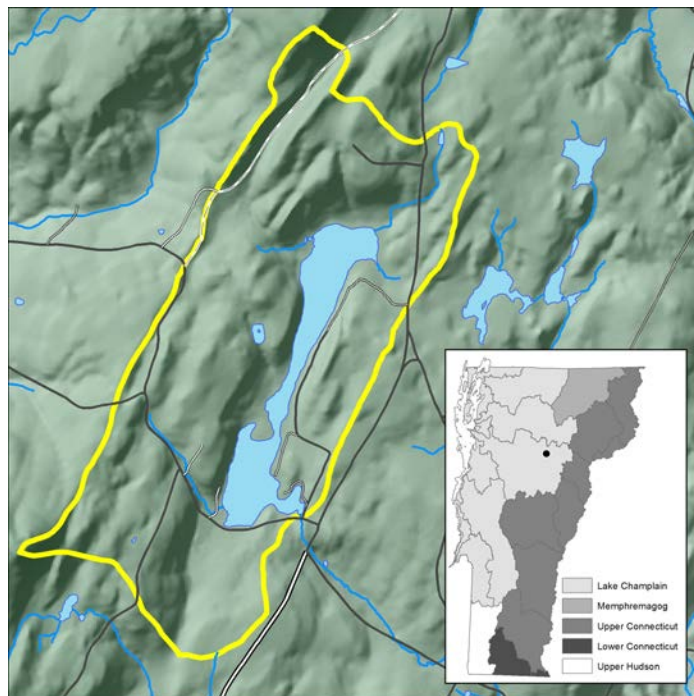
Ratio (Basin:Lake): 13:1

Maximum Depth: 31 ft (9.4 m)

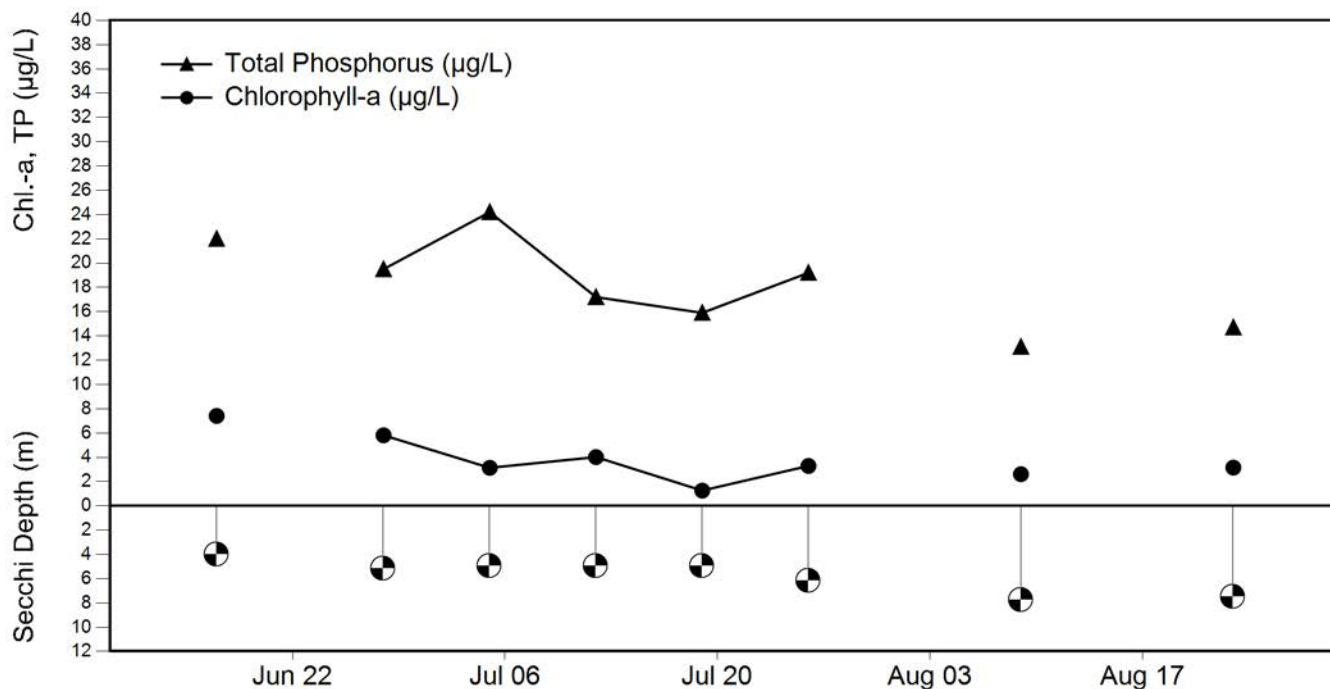
Mean Depth: 11 ft (3.4 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	8	4.0	5.9	7.8
Chl-a ( $\mu\text{g/L}$ )	8	1.2	3.8	9.0
Summer TP ( $\mu\text{g/L}$ )	8	13.1	18.2	24.2



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# CURTIS POND

## Annual Data

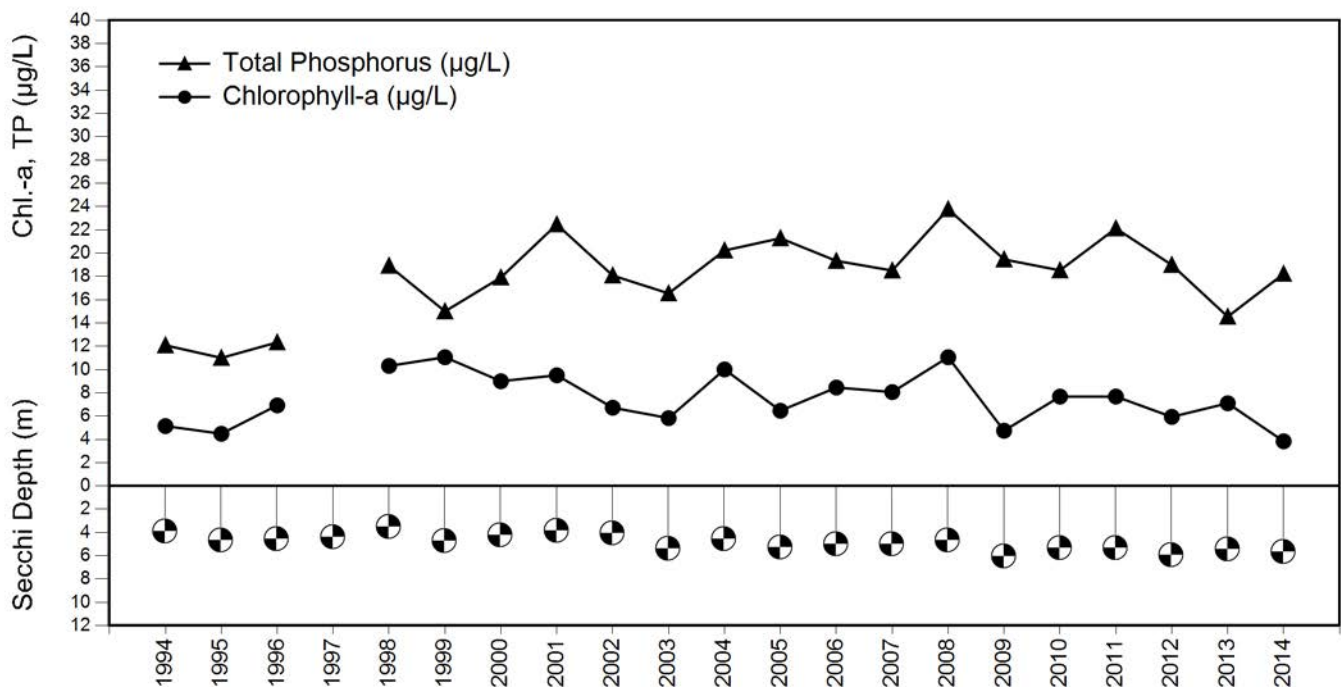
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1994	12	3.9	5.1	12.1	
1995	10	4.7	4.5	11.0	17.7
1996	12	4.6	6.9	12.3	
1985					21.0
1983					19.0
1980					8.0
1987					21.0
1979					12.0
1984					19.0
1986					24.0
1981					17.0
1993					23.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	12	4.4			
1998	12	3.6	10.3	18.9	
1999	10	4.7	11.1	15.0	
2000	11	4.3	9.0	17.9	
2001	15	3.9	9.5	22.5	31.0
2002	13	4.1	6.7	18.1	
2003	11	5.4	5.8	16.5	
2004	14	4.6	10.0	20.2	19.7
2005	16	5.3	6.5	21.3	27.0
2006	14	5.0	8.5	19.3	19.6
2007	12	5.0	8.1	18.5	
2008	14	4.7	11.1	23.8	24.7
2009	13	6.1	4.7	19.5	
2010	14	5.4	7.7	18.5	21.6
2011	12	5.4	7.7	22.1	
2012	12	6.0	5.9	19.0	18.2
2013	12	5.5	7.1	14.5	
2014	8	5.7	3.8	18.2	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# DANBY POND

Danby, VT

**Lay Monitor:** Glenn Williams & Mie Kingsley  
**Former Lay Monitors:** Robert & Ruth Easton

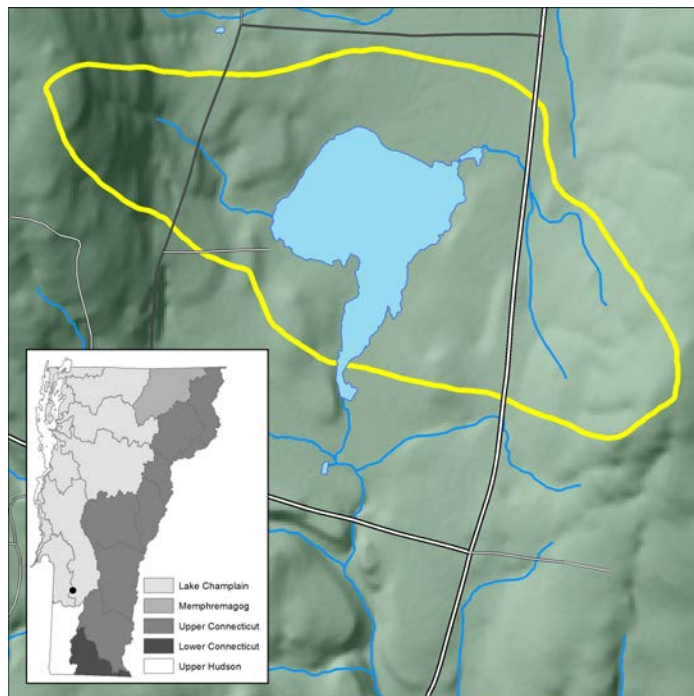
## Physical

Danby Pond is a small, warmwater, natural pond.

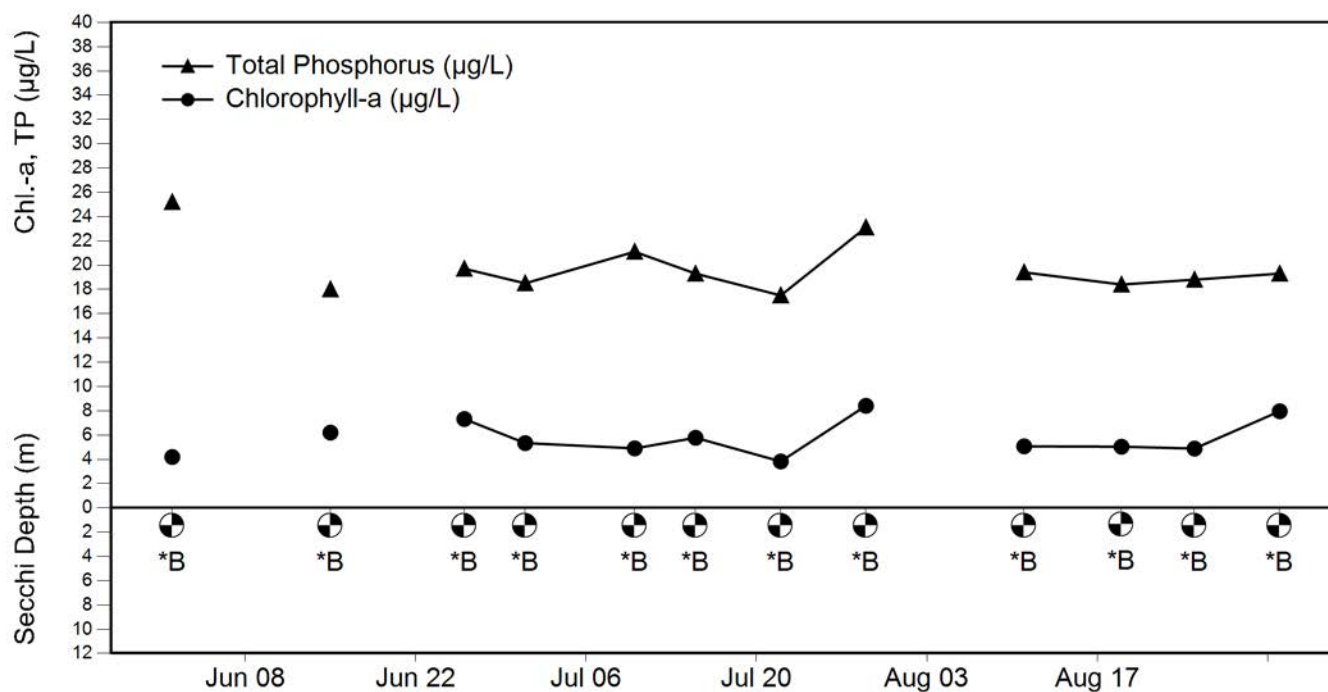
Lake Surface Area: 56 acres  
 Drainage Basin Area: 388 acres  
 Ratio (Basin:Lake): 7:1  
 Maximum Depth: 6 ft (1.8 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m) *B	12	1.2	1.3	1.5
Chl-a (µg/L)	12	3.6	5.7	8.5
Summer TP (µg/L)	12	17.5	19.9	25.2



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# DANBY POND

## Annual Data

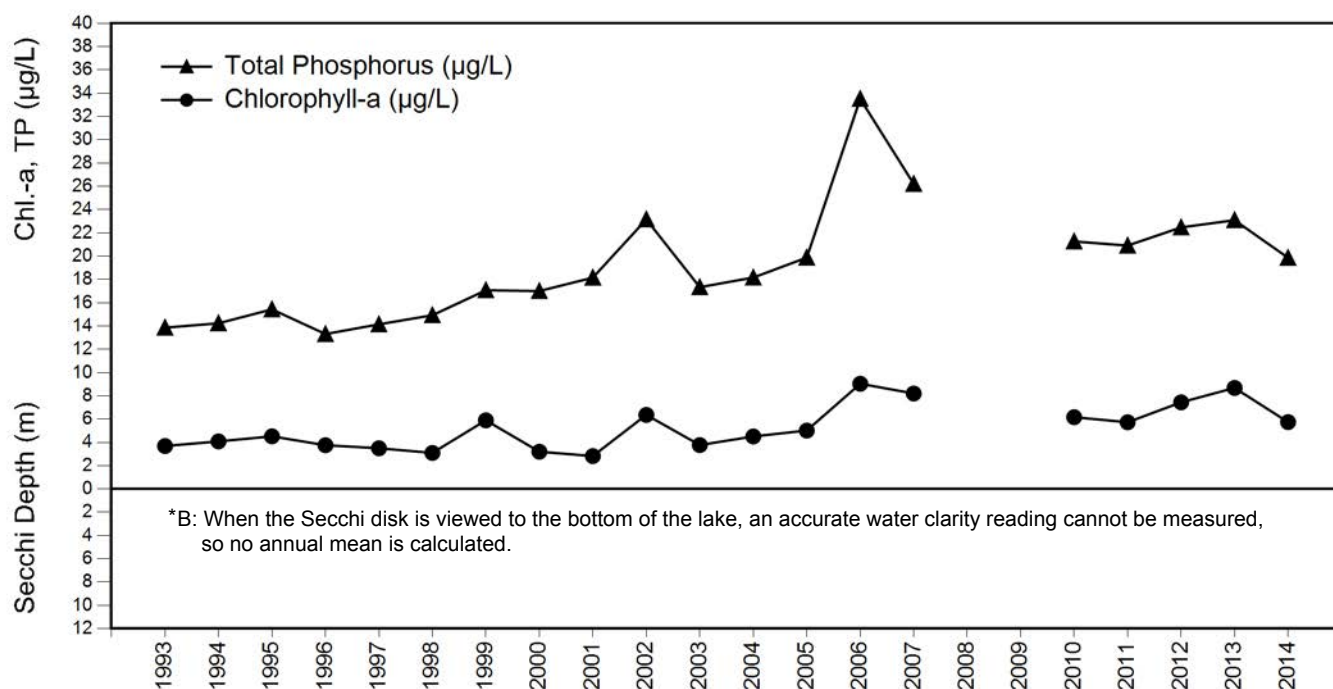
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1993	14	*B	3.7	13.9	
1994	13	*B	4.1	14.2	6.7
1995	14	*B	4.5	15.4	5.0
1996	13	*B	3.8	13.3	
1979					10.0
1992					8.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	14	*B	3.5	14.1	11.0
1998	14	*B	3.1	14.9	
1999	14	*B	5.9	17.1	
2000	12	*B	3.2	17.0	10.7
2001	13	*B	2.8	18.2	11.7
2002	13	*B	6.4	23.2	
2003	12	*B	3.8	17.3	
2004	13	*B	4.5	18.2	11.7
2005	12	*B	5.0	19.9	12.0
2006	11	*B	9.0	33.5	
2007	11	*B	8.2	26.2	
2008					28.2
2010	11	*B	6.2	21.3	12.0
2011	11	*B	5.7	20.9	16.5
2012	11	*B	7.4	22.5	18.4
2013	10	*B	8.7	23.1	
2014	12	*B	5.7	19.9	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# LAKE DUNMORE

Salisbury, Leicester, VT

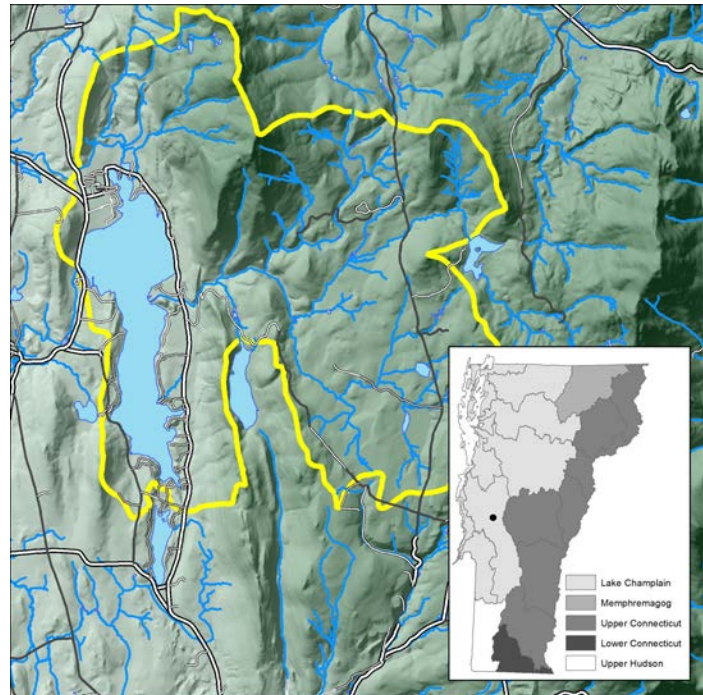
**Lay Monitor:** David Volz & the Milfoil Crew  
Richard Dahlgren

**Former Lay Monitors:** Troy Carr & the Milfoil Crew  
Joe Carr, Rob Nicol, & Will Pitkin  
Andrew Menkart & the Milfoil Crew  
Liam Powers  
Matt Hayden  
Nick Staats  
Lawton Redman

## Physical

Lake Dunmore is a long lake divided into two sections – a deep northern section in the town of Salisbury and a shallow southern section in the town of Leicester.

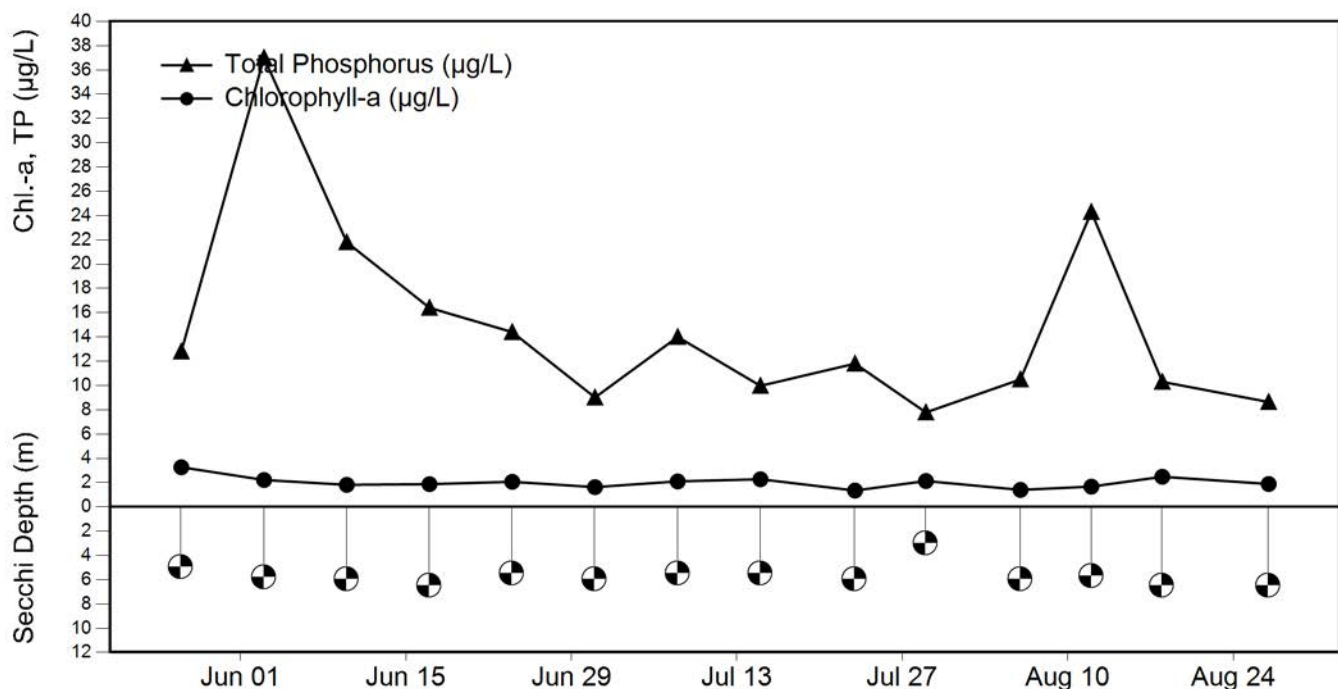
Lake Surface Area: 985 acres  
Drainage Basin Area: 13,068 acres  
Ratio (Basin:Lake): 13:1  
Maximum Depth: 105 ft (32.0 m)  
Mean Depth: 28 ft (8.5 m)



## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	14	3.0	5.7	6.5
Chl-a (µg/L)	14	0.9	2.0	3.6
Summer TP (µg/L)	14	7.8	14.9	37.0

## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE DUNMORE

## Annual Data

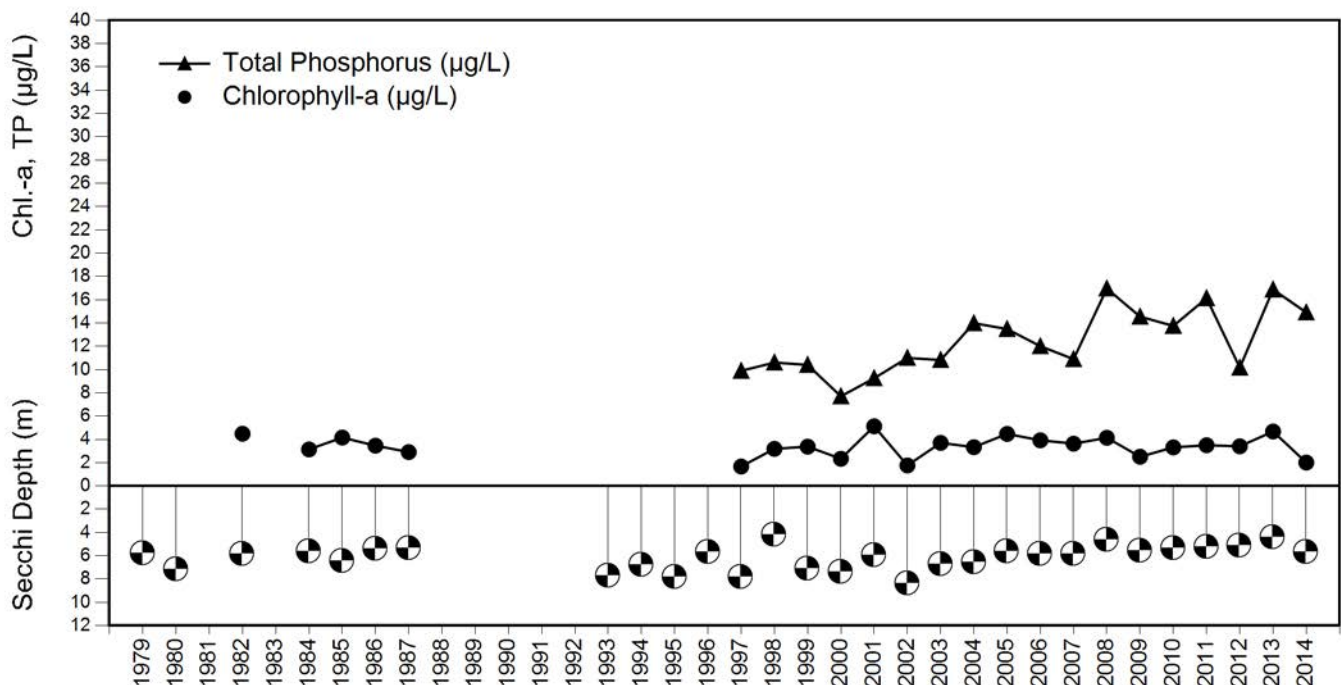
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	22	5.8			9.0
1980	13	7.2			4.0
1982	11	5.8	4.5		12.0
1984	13	5.7	3.1		8.0
1985	9	6.4	4.2		7.0
1986	12	5.4	3.5		8.0
1987	10	5.4	2.9		9.0
1993	10	7.7			
1994	11	6.8			
1995	8	7.8			7.5
1996	9	5.7			8.3
1983					7.0
1981					6.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	9	7.8	1.7	9.9	
1998	10	4.2	3.2	10.6	8.0
1999	10	7.1	3.4	10.4	6.0
2000	10	7.4	2.3	7.7	7.7
2001	8	6.0	5.1	9.3	
2002	14	8.4	1.8	11.0	
2003	12	6.7	3.7	10.8	
2004	12	6.6	3.3	14.0	11.7
2005	9	5.6	4.5	13.5	7.8
2006	10	5.9	3.9	12.0	
2007	11	5.9	3.6	10.9	
2008	10	4.6	4.1	17.0	7.3
2009	11	5.6	2.5	14.5	8.8
2010	7	5.4	3.3	13.7	
2011	9	5.2	3.5	16.1	8.7
2012	13	5.2	3.4	10.2	
2013	9	4.4	4.7	16.9	
2014	14	5.7	2.0	14.9	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# EAST LONG POND

Woodbury, VT

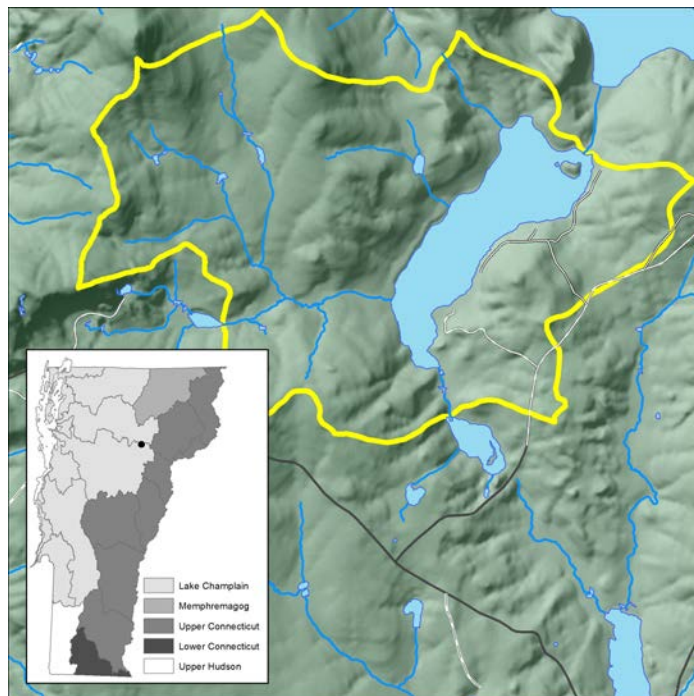
**Lay Monitor:** Barry Goldensohn  
**Former Lay** Perry Kiser  
**Monitors:** Joe Ynseula  
 Richard Brown

## Physical

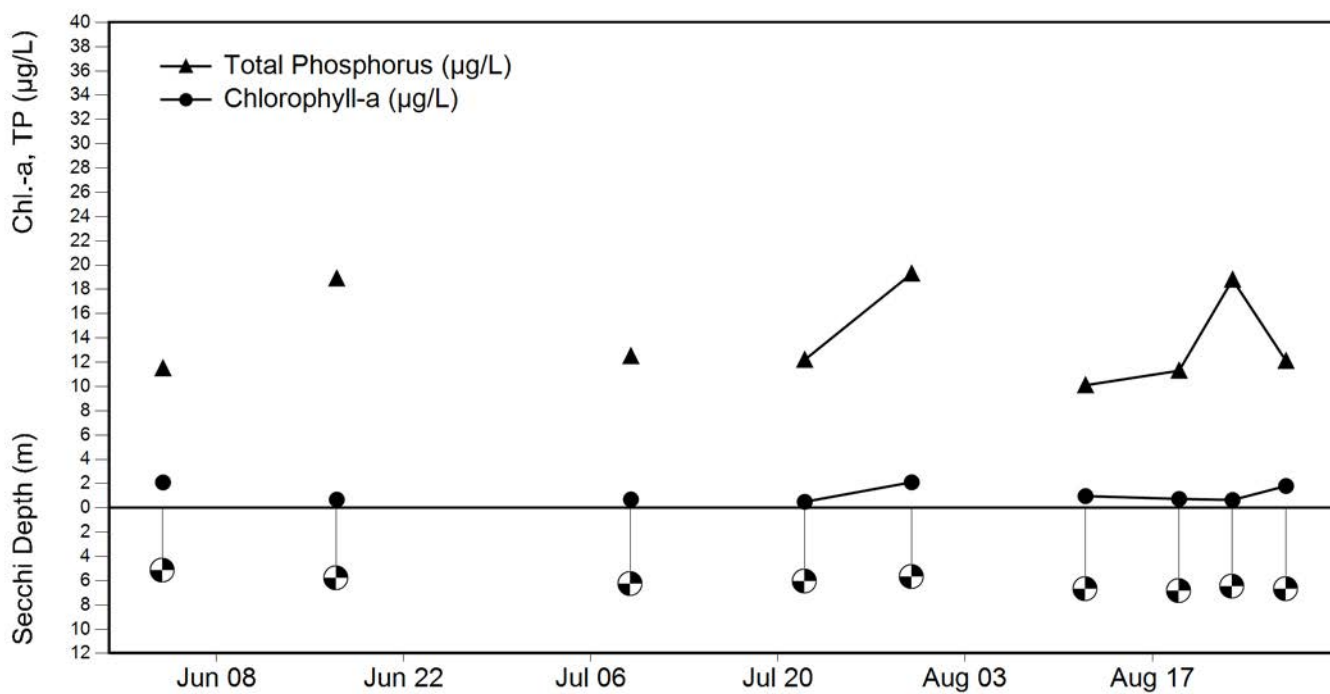
Lake Surface Area: 188 acres  
 Drainage Basin Area: 2,223 acres  
 Ratio (Basin:Lake): 12:1  
 Maximum Depth: 105 ft (32.0 m)  
 Mean Depth: 47 ft (14.3 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	5.2	6.2	6.9
Chl-a ( $\mu\text{g/L}$ )	9	0.5	1.1	2.8
Summer TP ( $\mu\text{g/L}$ )	9	10.1	14.1	19.3



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



## East Long Pond

### Annual Data

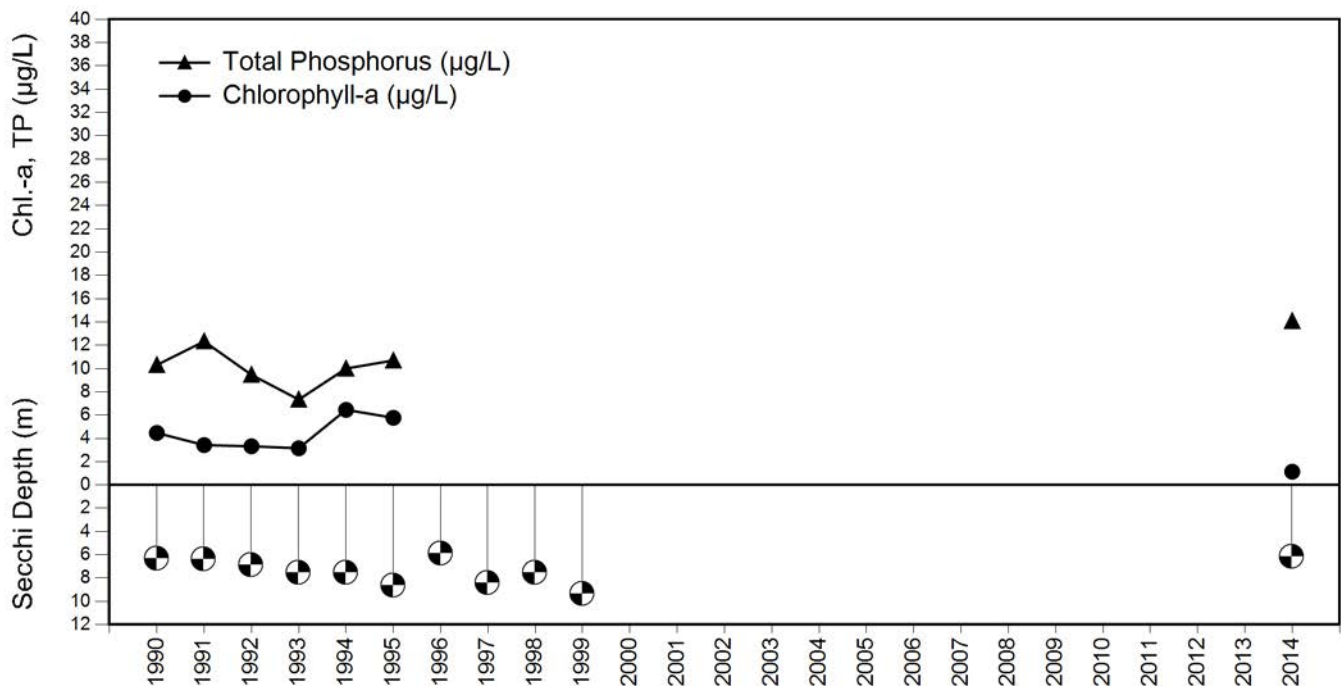
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1990	13	6.4	4.5	10.3	11.0
1991	15	6.4	3.4	12.3	7.0
1992	13	6.9	3.3	9.5	
1993	13	7.6	3.1	7.3	
1994	12	7.6	6.5	10.0	
1995	13	8.7	5.8	10.7	
1996	14	5.9			
1988					9.0
1989					9.0
1979					16.0

### Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	15	8.4			10.0
1998	15	7.5			5.3
1999	16	9.4			
2000					7.3
2007					10.4
2014	9	6.2	1.1	14.1	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# ECHO LAKE

## Charleston, VT

**Lay Monitor:** Peter Engels & Mike Vinton  
**Former Lay Monitors:** Eric Stevens

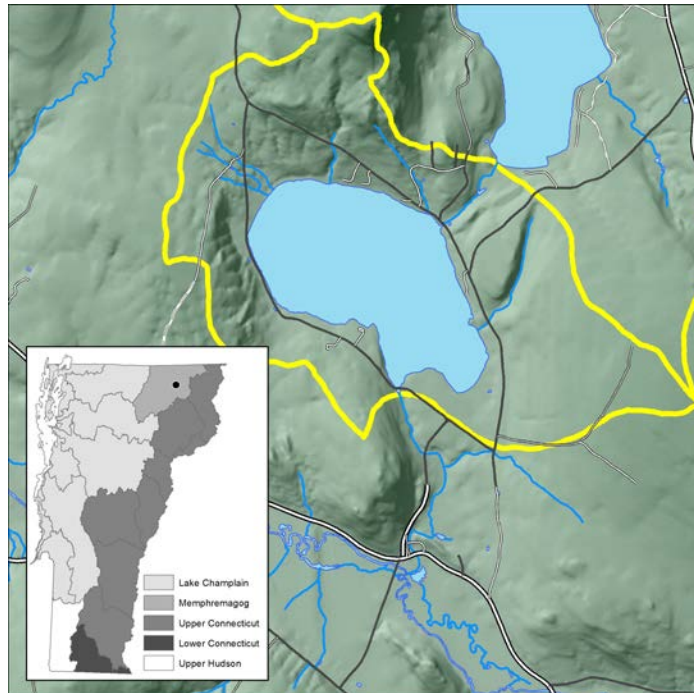
### Physical

Echo Lake is a large lake that supports both warm- and coldwater fish.

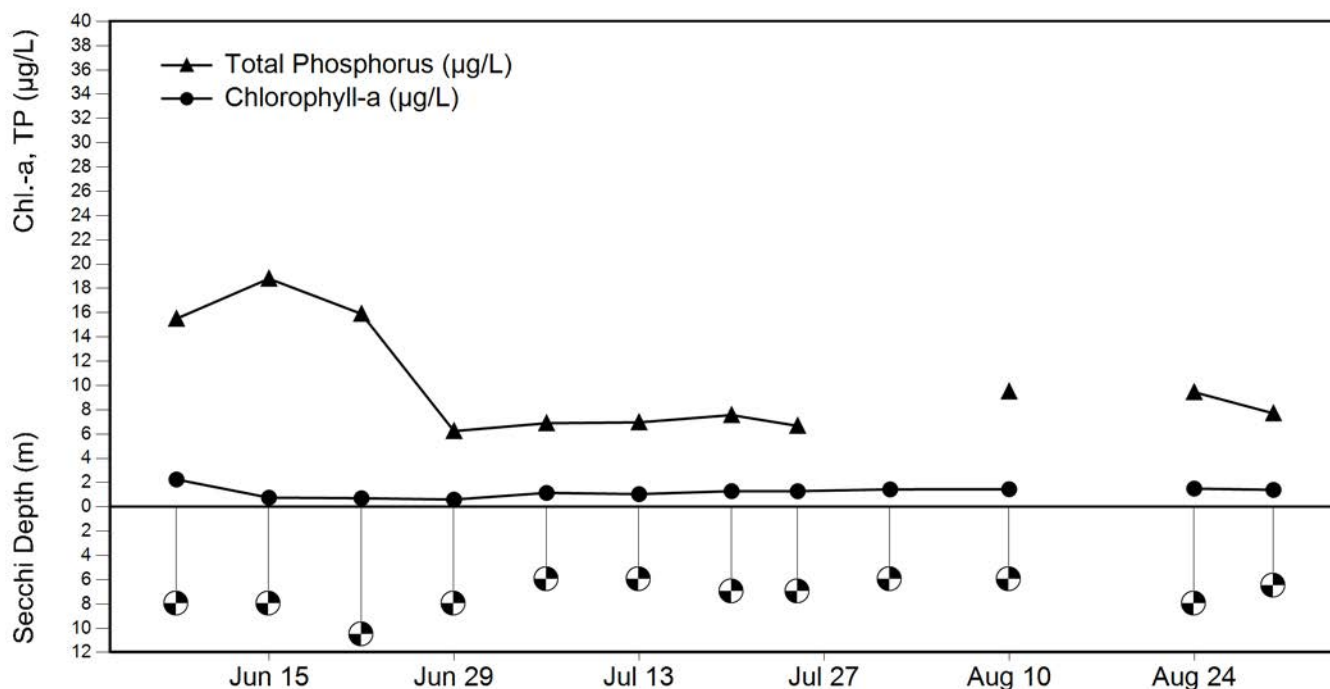
Lake Surface Area: 550 acres  
 Drainage Basin Area: 15,186 acres  
 Ratio (Basin:Lake): 30:1  
 Maximum Depth: 129 ft (39.3 m)  
 Mean Depth: 58 ft (17.7 m)

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	12	4.8	6.3	10.5
Chl-a ( $\mu\text{g/L}$ )	12	0.5	1.2	2.3
Summer TP ( $\mu\text{g/L}$ )	11	6.2	10.1	18.8



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# ECHO LAKE

## Annual Data

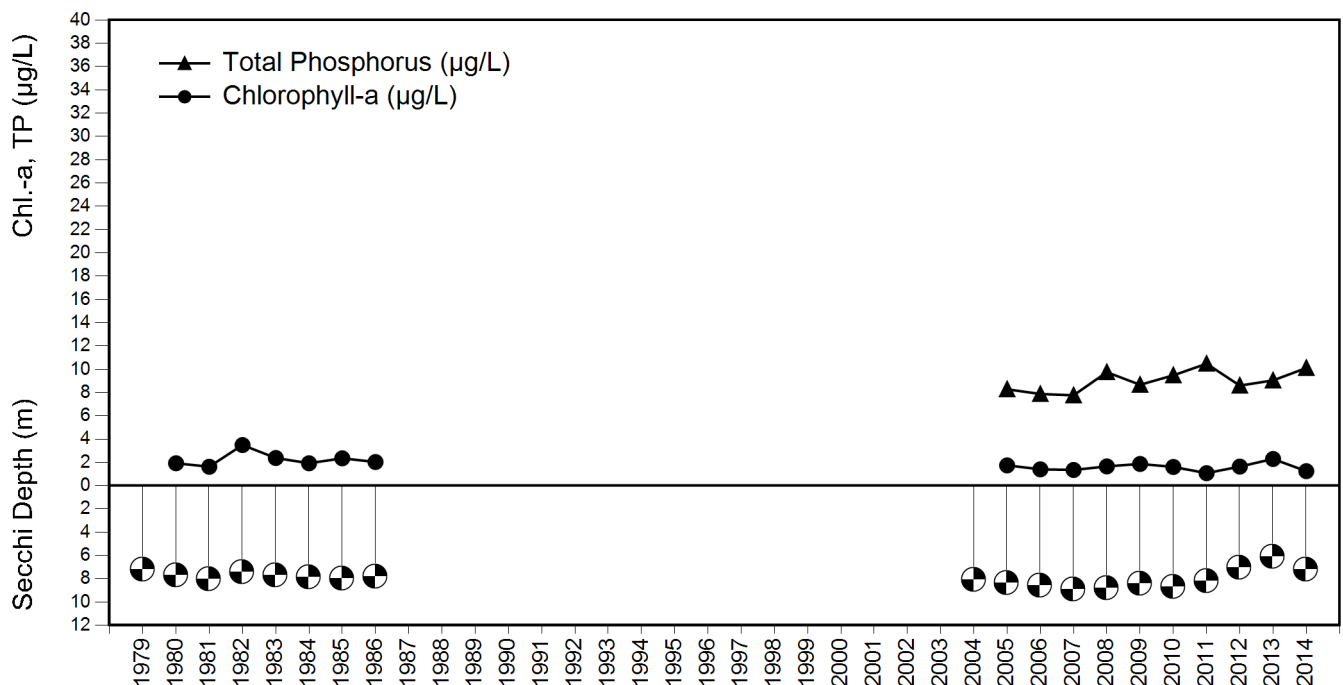
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	17	7.2			3.0
1980	13	7.8	1.9		7.0
1981	14	8.0	1.6		7.0
1982	10	7.5	3.5		10.0
1983	8	7.7	2.4		7.0
1984	9	7.9	1.9		8.0
1985	15	8.0	2.3		9.0
1986	14	7.8	2.0		9.0
1987					8.0
1994					8.3

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
2000					6.0
2001					7.3
2002					6.0
2003					9.7
2004	12	8.1			7.3
2005	11	8.4	1.7	8.3	
2006	13	8.6	1.4	7.9	9.7
2007	12	8.9	1.3	7.8	8.1
2008	10	8.8	1.7	9.7	
2009	10	8.4	1.9	8.7	
2010	10	8.7	1.6	9.5	
2011	8	8.2	1.1	10.5	
2012	10	7.1	1.6	8.6	
2013	9	6.1	2.3	9.0	
2014	12	7.3	1.2	10.1	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE EDEN

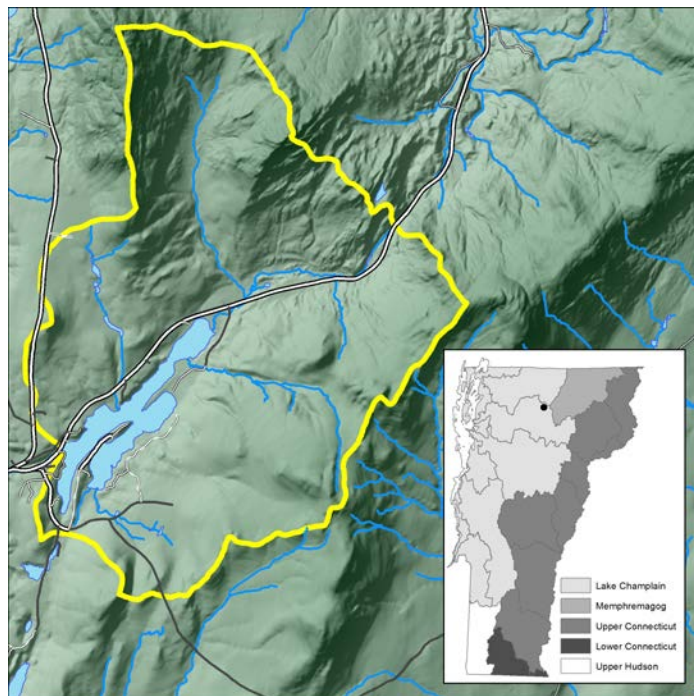
Eden, VT

**Lay Monitor:** Sue and Ed Gilbert  
**Former Lay Monitors:** Terry and Bonnie Francis  
 Steve & Teela Leach  
 Bruce Lyon  
 Gary J Durett  
 Conrad Klefos  
 Ray Rodrigue

## Physical

Lake Eden is a moderately sized, warmwater lake which is nearly bisected by narrow peninsulas of the northeastern and southwestern lake shores.

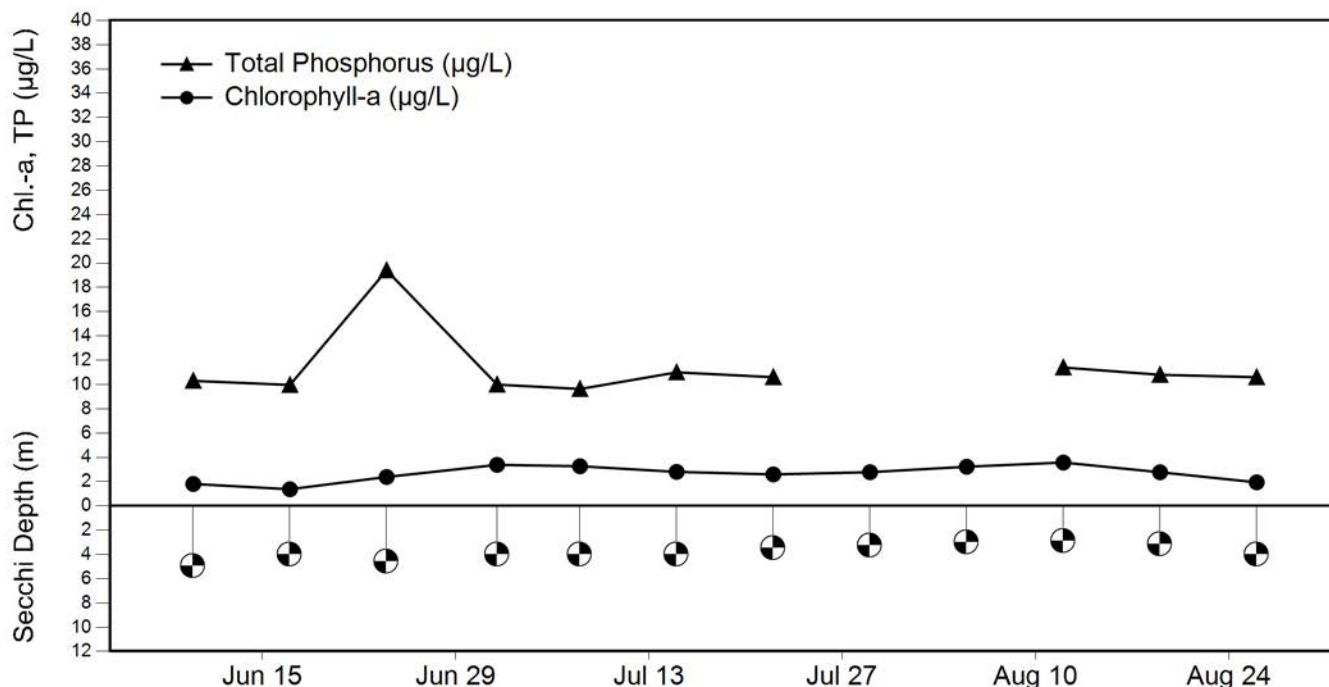
Lake Surface Area: 194 acres  
 Drainage Basin Area: 2,347 acres  
 Ratio (Basin:Lake): 12:1  
 Maximum Depth: 40 ft (12.2 m)  
 Mean Depth: 15 ft (4.6 m)



## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	12	2.5	3.8	6.3
Chl-a ( $\mu\text{g/L}$ )	12	1.4	2.7	3.8
Summer TP ( $\mu\text{g/L}$ )	10	9.6	11.4	19.4

## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE EDEN

## Annual Data

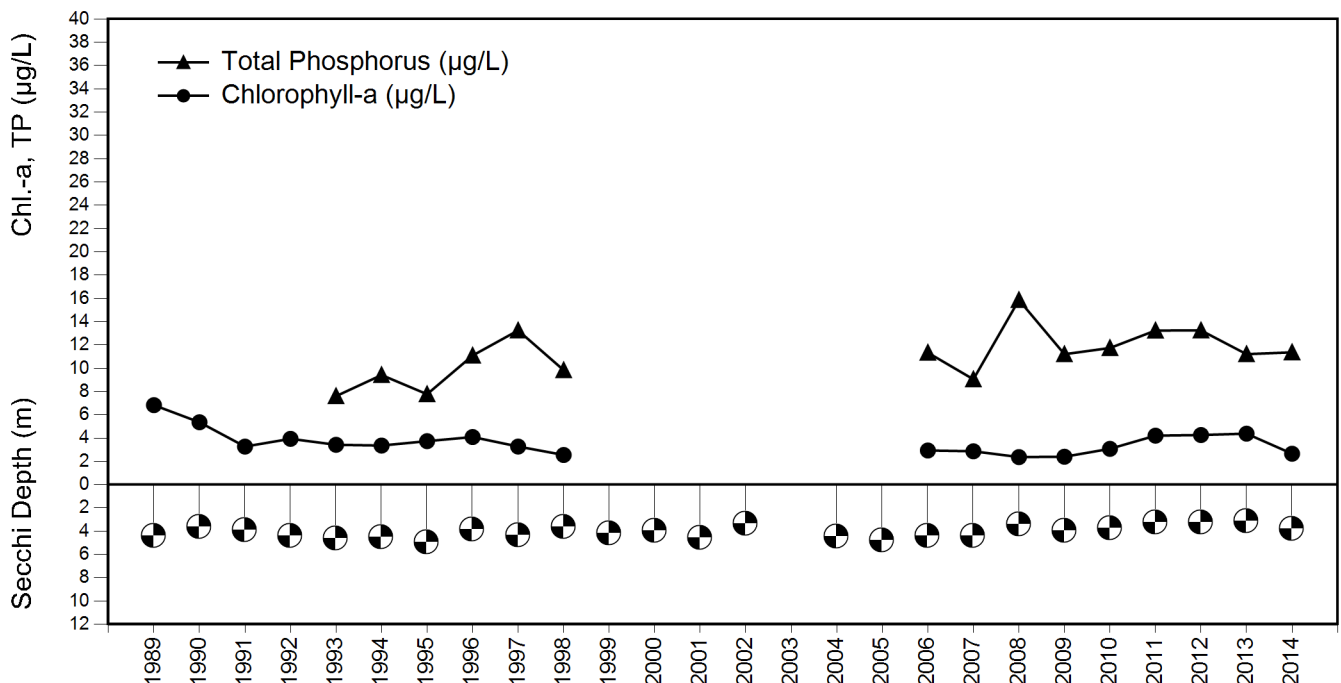
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1989	9	4.4	6.8		9.0
1990	3	3.7	5.4		
1991	9	3.9	3.3		
1992	13	4.4	3.9		
1993	12	4.6	3.4	7.6	
1994	12	4.5	3.4	9.4	5.7
1995	13	5.0	3.7	7.8	
1996	11	3.9	4.1	11.1	
1982					10.0
1981					5.0
1983					9.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	9	4.4	3.3	13.3	
1998	6	3.7	2.5	9.8	6.0
1999	8	4.2			
2000	9	4.0			
2001	9	4.6			8.0
2002	9	3.4			
2004	8	4.5			
2005	13	4.8			
2006	11	4.4	2.9	11.3	
2007	12	4.4	2.9	9.1	13.7
2008	13	3.5	2.4	15.9	
2009	9	4.0	2.4	11.2	10.5
2010	12	3.8	3.1	11.7	
2011	13	3.3	4.2	13.2	
2012	13	3.2	4.3	13.2	
2013	12	3.2	4.4	11.2	
2014	12	3.8	2.7	11.4	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# ELFIN LAKE

Wallingford, VT

**Lay Monitor:** Mike Bird  
**Former Lay Monitor:** Anne Miller

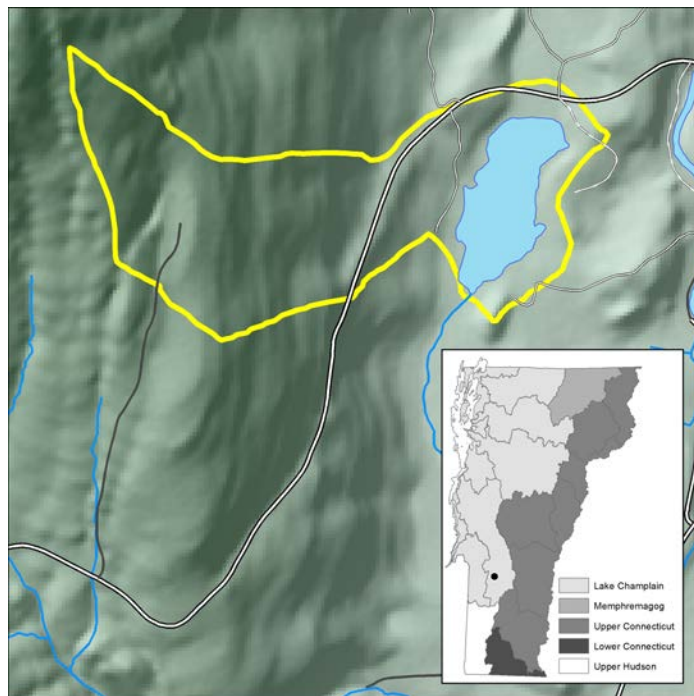
## Physical

Elfin Lake is a small, undeveloped lake.

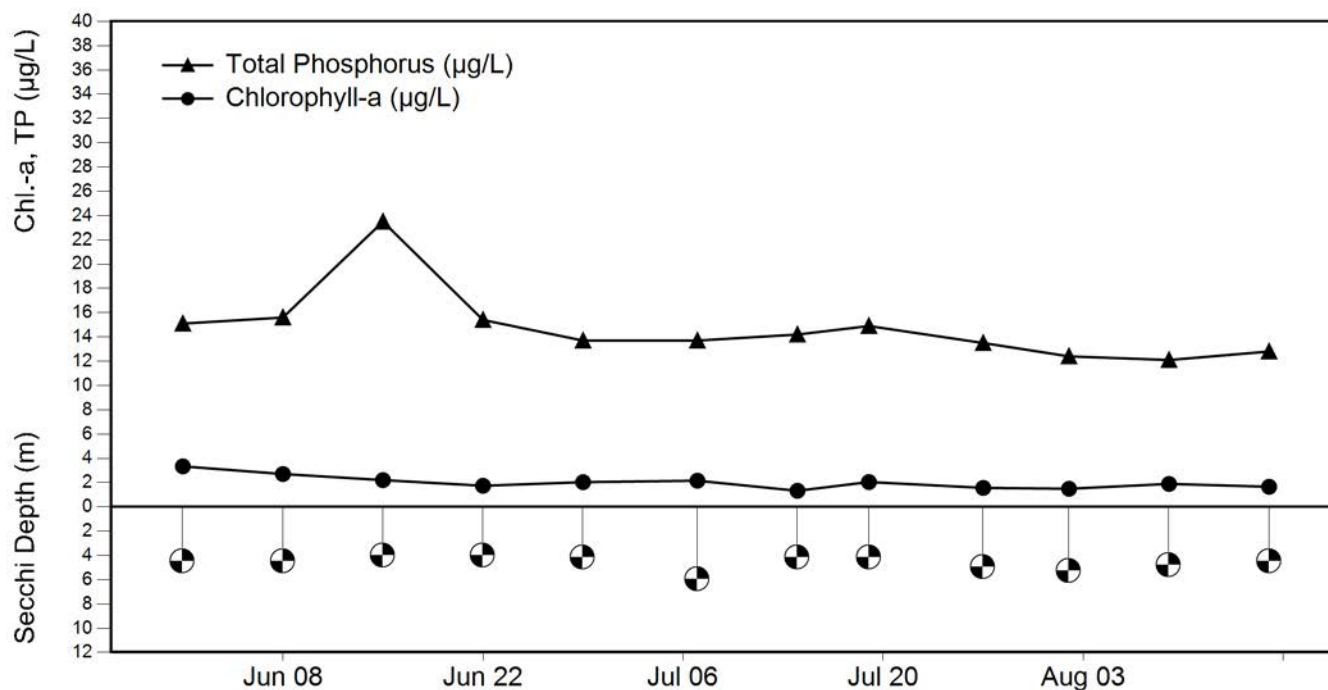
Lake Surface Area: 16 acres  
 Drainage Basin Area: 228 acres  
 Ratio (Basin:Lake): 14:1  
 Maximum Depth: 37 ft (11.2 m)  
 Mean Depth: 12 ft (3.7 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	13	3.9	4.5	6.0
Chl-a ( $\mu\text{g/L}$ )	12	1.2	2.0	3.5
Summer TP ( $\mu\text{g/L}$ )	12	12.1	14.7	23.5



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# ELFIN LAKE

## Annual Data

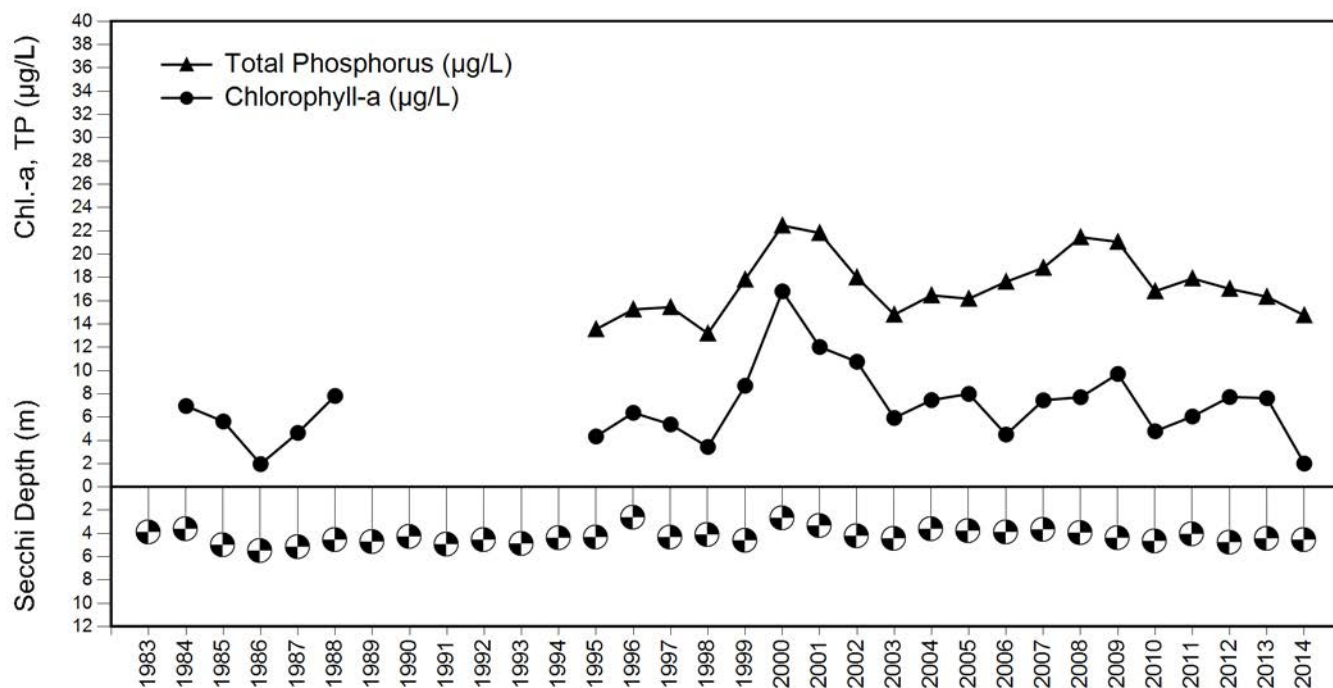
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1983	12	3.9			11.0
1984	13	3.6	7.0		16.0
1985	13	5.0	5.6		16.0
1986	13	5.5	2.0		
1987	13	5.2	4.6		
1988	14	4.6	7.8		
1989	8	4.7			18.0
1990	6	4.3			
1991	14	5.0			
1992	10	4.6			
1993	11	4.9			
1994	11	4.4			
1995	11	4.4	4.3	13.5	
1996	12	2.7	6.4	15.3	13.0
1979					17.0
1981					17.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	10	4.4	5.4	15.4	
1998	11	4.1	3.4	13.2	
1999	11	4.7	8.7	17.8	
2000	11	2.7	16.8	22.5	
2001	12	3.4	12.0	21.8	
2002	12	4.3	10.8	18.0	
2003	10	4.5	5.9	14.8	
2004	10	3.7	7.5	16.5	17.0
2005	12	3.8	8.0	16.2	
2006	11	3.9	4.5	17.6	
2007	11	3.7	7.4	18.8	18.6
2008	11	4.0	7.7	21.5	
2009	11	4.4	9.7	21.1	
2010	12	4.7	4.8	16.8	
2011	12	4.1	6.1	17.9	
2012	12	4.8	7.7	17.0	
2013	12	4.5	7.6	16.3	
2014	12	4.6	2.0	14.7	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# LAKE ELMORE

## Elmore, VT

**Lay Monitor:** Dave Anderson  
**Former Lay Monitors:** Cindy Blackburn  
 Joe Ciccola  
 Lisa Kelly & Dave Peters  
 June Mendell  
 Herbert Jorgensen

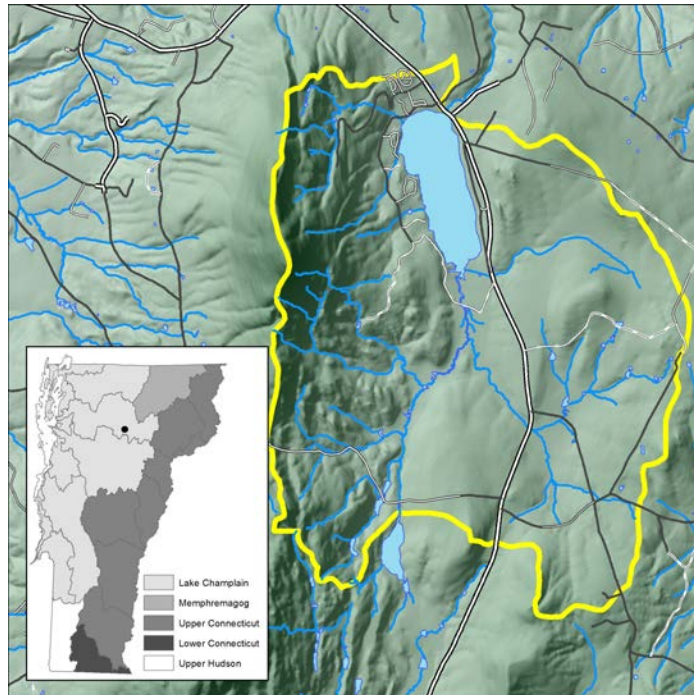
## Physical

Lake Elmore is a large, fairly shallow, natural lake.

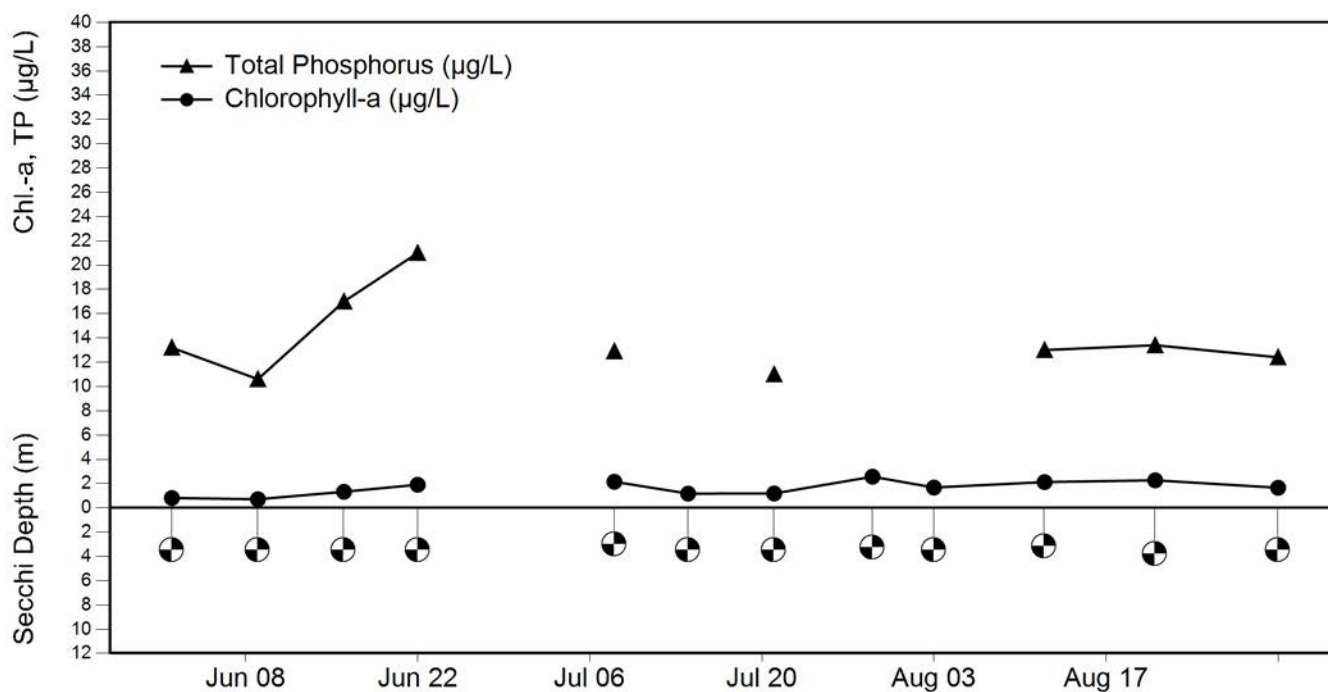
Lake Surface Area: 219 acres  
 Drainage Basin Area: 5,574 acres  
 Ratio (Basin:Lake): 26:1  
 Maximum Depth: 17 ft (5.2 m)  
 Mean Depth: 11 ft (3.4 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	12	3.0	3.4	3.8
Chl-a ( $\mu\text{g/L}$ )	12	0.5	1.6	2.7
Summer TP ( $\mu\text{g/L}$ )	9	10.6	13.8	21.0



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE ELMORE

## Annual Data

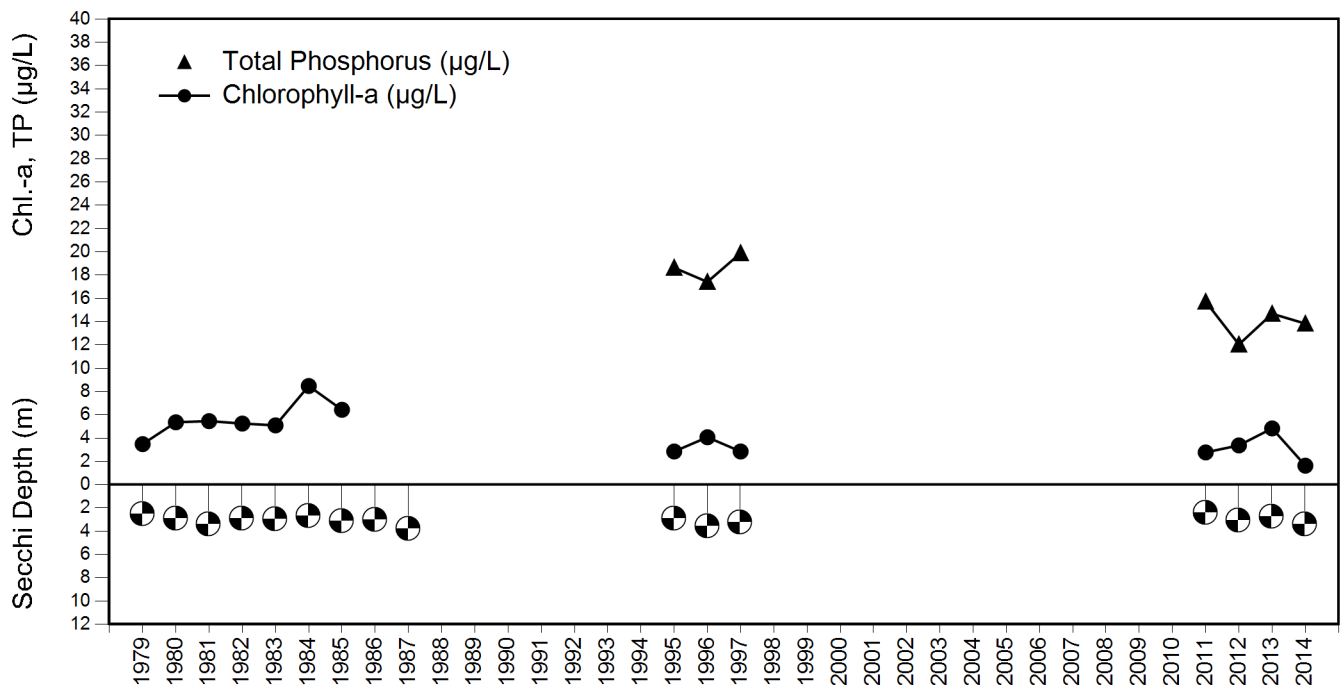
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	16	2.6	3.5		10.0
1980	9	2.9	5.4		10.0
1981	7	3.4	5.5		16.0
1982	13	2.9	5.2		14.0
1983	12	3.0	5.1		15.0
1984	13	2.7	8.5		10.0
1985	13	3.2	6.4		12.0
1986	11	3.1			10.0
1987	13	3.8			12.0
1995	11	2.9	2.8	18.6	13.7
1996	12	3.6	4.1	17.4	10.3
1990					10.0
1988					12.0
1989					19.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	9	3.3	2.8	19.9	
2001					13.0
2004					16.0
2007					14.3
2008					16.0
2011	9	2.5	2.8	15.7	
2012	6	3.1	3.4	12.0	
2013	11	2.8	4.8	14.7	
2014	12	3.4	1.6	13.8	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# FAIRFIELD POND

Fairfield, VT

**Lay Monitor:** John Hancock  
**Former Lay Monitors:** Donald and Harriet Gray  
 Sally Collopy Thomas  
 Benoure Kimberly  
 Benoure Mary Benoure  
 David Bushey Ron  
 Bocash Susan Bushey

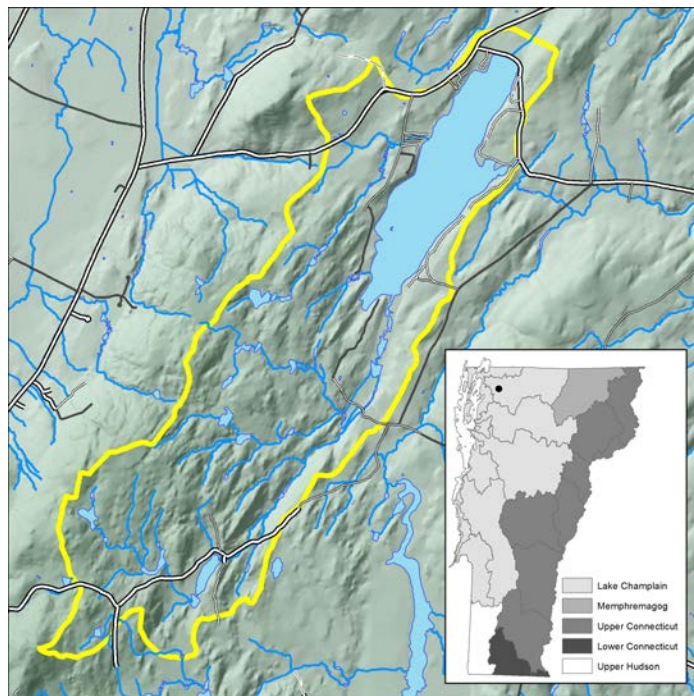
## Physical

Fairfield Pond is a large, fairly shallow, natural lake.

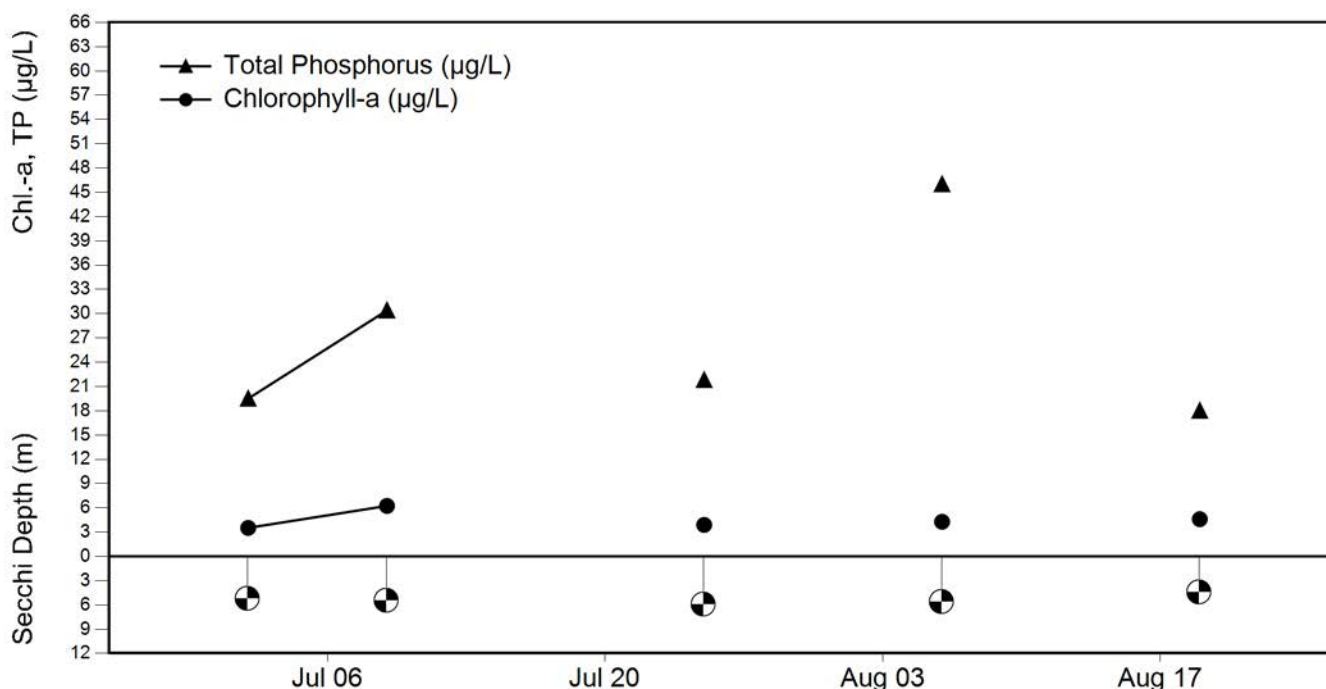
Lake Surface Area: 446 acres  
 Drainage Basin Area: 3,758 acres  
 Ratio (Basin:Lake): 8:1  
 Maximum Depth: 42 ft (12.8 m)  
 Mean Depth: 23 ft (7.0 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	5	4.5	5.4	6.0
Chl-a ( $\mu\text{g/L}$ )	5	3.4	4.5	6.7
Summer TP ( $\mu\text{g/L}$ )	5	18.0	27.1	46.0
Spring TP ( $\mu\text{g/L}$ )	1		23.1	



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# FAIRFIELD POND

## Annual Data

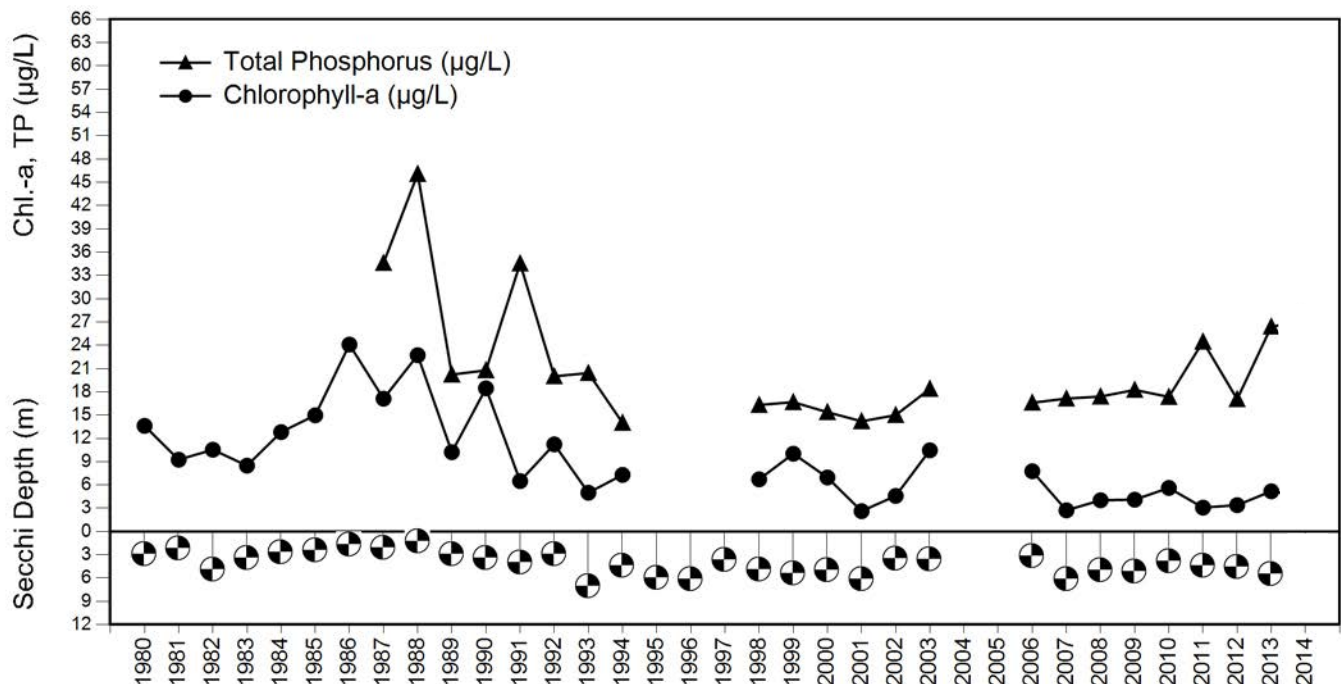
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1980	13	2.9	13.6		25.0
1981	13	2.2	9.3		21.0
1982	12	4.9	10.5		30.0
1983	12	3.5	8.5		35.0
1984	9	2.7	12.8		47.0
1985	13	2.4	15.0		48.0
1986	12	1.7	24.1		52.0
1987	13	2.1	17.1	34.6	39.0
1988	14	1.3	22.7	46.1	41.0
1989	12	3.0	10.2	20.2	28.0
1990	13	3.5	18.5	20.8	41.0
1991	13	4.0	6.5	34.5	19.0
1992	9	2.9	11.2	20.0	14.0
1993	12	7.1	5.0	20.4	17.3
1994	10	4.5	7.3	14.0	19.3
1995	11	6.0			16.7
1996	14	6.2			17.3
1979					19.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	11	3.7			16.0
1998	13	5.0	6.7	16.3	16.3
1999	12	5.4	10.0	16.7	13.3
2000	8	5.0	7.0	15.4	15.3
2001	5	6.2	2.6	14.2	16.0
2002	9	3.5	4.6	15.0	
2003	8	3.6	10.5	18.4	
2004					18.3
2006	13	3.2	7.8	16.6	
2007	12	6.2	2.7	17.1	21.7
2008	13	5.1	4.0	17.4	
2009	14	5.2	4.1	18.2	
2010	14	3.8	5.6	17.3	
2011	3	4.4	3.1	24.5	
2012	13	4.6	3.4	17.0	
2013	9	5.5	5.2	26.4	
2014	5	5.4	4.5	27.1	23.1

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

**Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth**





# LAKE FAIRLEE

Fairlee, West Fairlee and Thetford, VT

**Lay Monitor:** Gordon Kerr  
**Former Lay Monitors:** Chris Madden  
 Evan Madden  
 Don Wilson  
 John Chambers

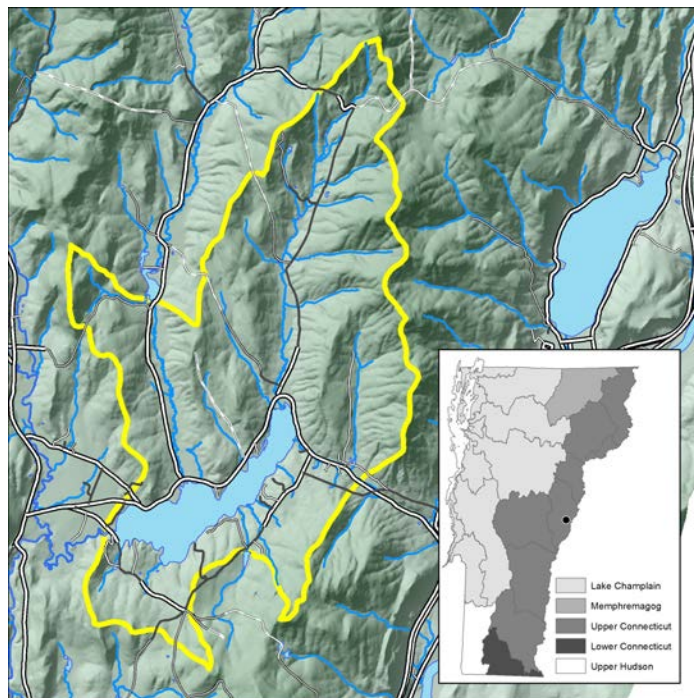
## Physical

Lake Fairlee is a large, warmwater lake.

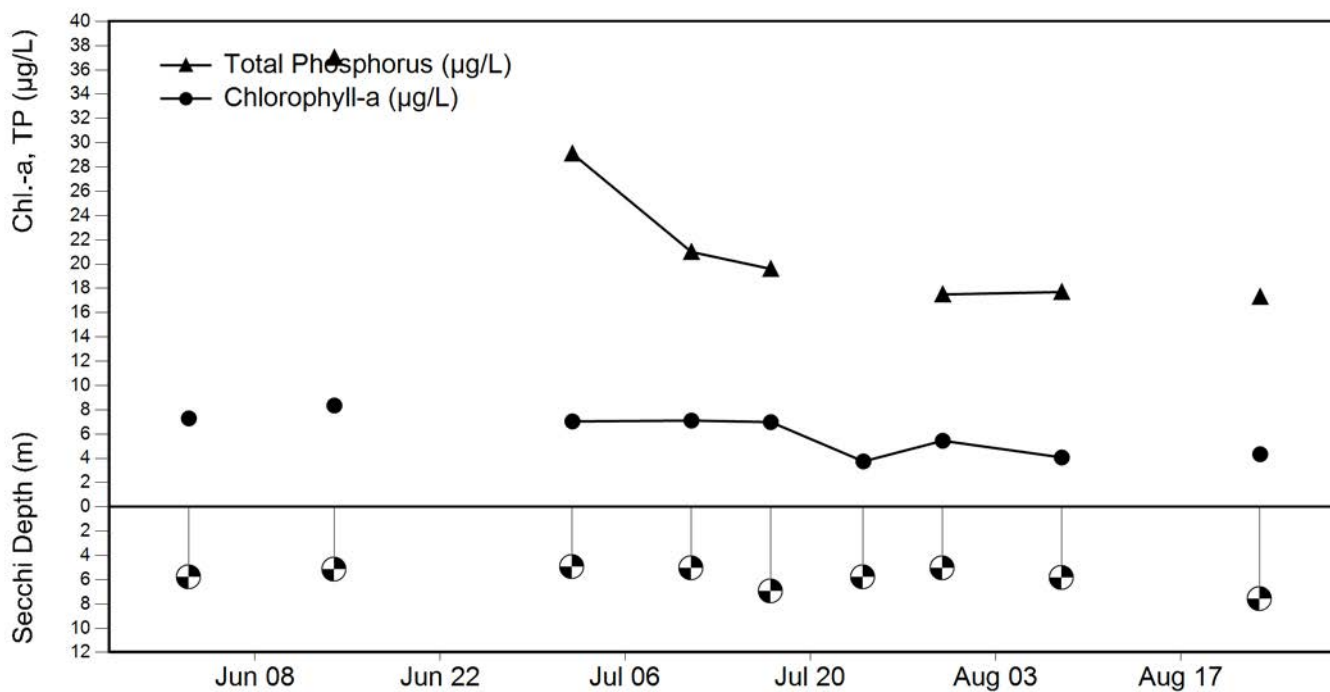
Lake Surface Area: 457 acres  
 Drainage Basin Area: 12,976 acres  
 Ratio (Basin:Lake): 28:1  
 Maximum Depth: 50 ft (15.2 m)  
 Mean Depth: 23 ft (7.0 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	4.8	5.7	7.6
Chl-a ( $\mu\text{g/L}$ )	9	2.4	6.1	11.6
Summer TP ( $\mu\text{g/L}$ )	8	17.3	25.0	41.1



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# LAKE FAIRLEE

## Annual Data

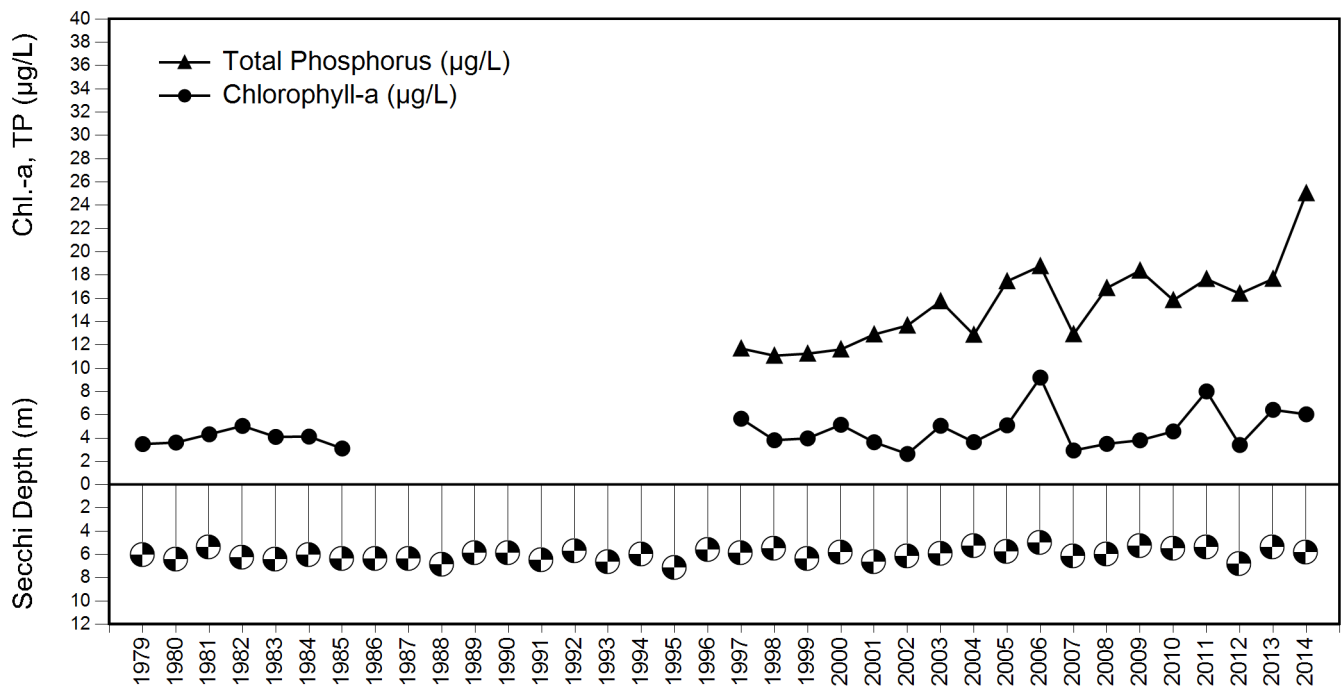
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	18	6.1	3.5		7.0
1980	13	6.5	3.6		8.0
1981	13	5.4	4.3		11.0
1982	11	6.3	5.0		16.0
1983	13	6.5	4.1		9.0
1984	12	6.1	4.1		9.0
1985	11	6.4	3.1		11.0
1986	8	6.4			11.0
1987	12	6.4			12.0
1988	12	6.9			
1989	11	5.9			
1990	12	5.9			
1991	13	6.5			
1992	14	5.8			
1993	12	6.7			
1994	13	6.0			
1995	13	7.2			
1996	13	5.7			11.7

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	13	5.9	5.7	11.7	
1998	13	5.5	3.8	11.1	9.3
1999	13	6.4	4.0	11.3	
2000	13	5.8	5.1	11.6	
2001	10	6.7	3.6	12.9	
2002	9	6.2	2.6	13.7	
2003	8	6.0	5.1	15.8	
2004	10	5.3	3.7	12.9	18.0
2005	10	5.8	5.1	17.5	
2006	10	5.0	9.2	18.8	13.5
2007	9	6.2	2.9	12.9	15.8
2008	9	6.0	3.5	16.9	11.8
2009	9	5.3	3.8	18.4	15.7
2010	9	5.5	4.6	15.8	
2011	8	5.4	8.0	17.7	
2012	9	6.8	3.4	16.4	
2013	8	5.4	6.4	17.7	
2014	9	5.8	6.0	25.0	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# FOSTERS POND

Peacham, VT

Lay Monitors: David & Marilyn Magnus

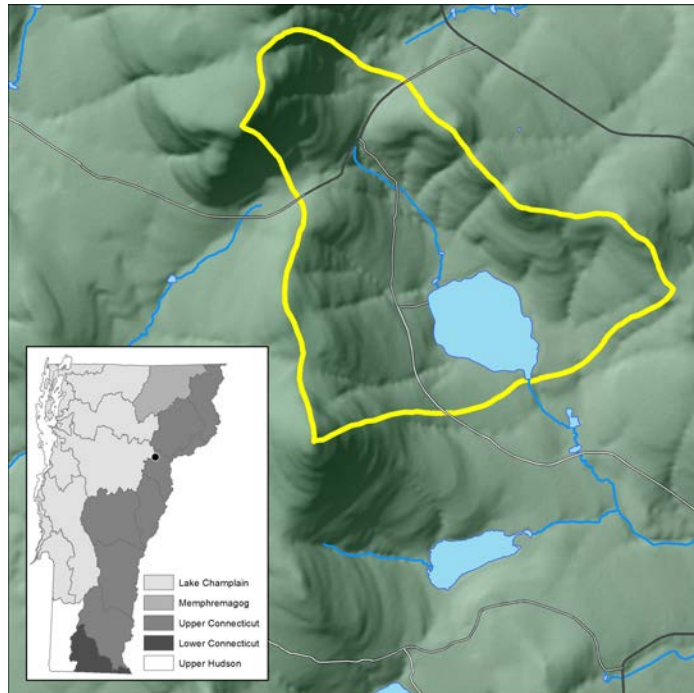
## Physical

Fosters Pond is a small, shallow pond.

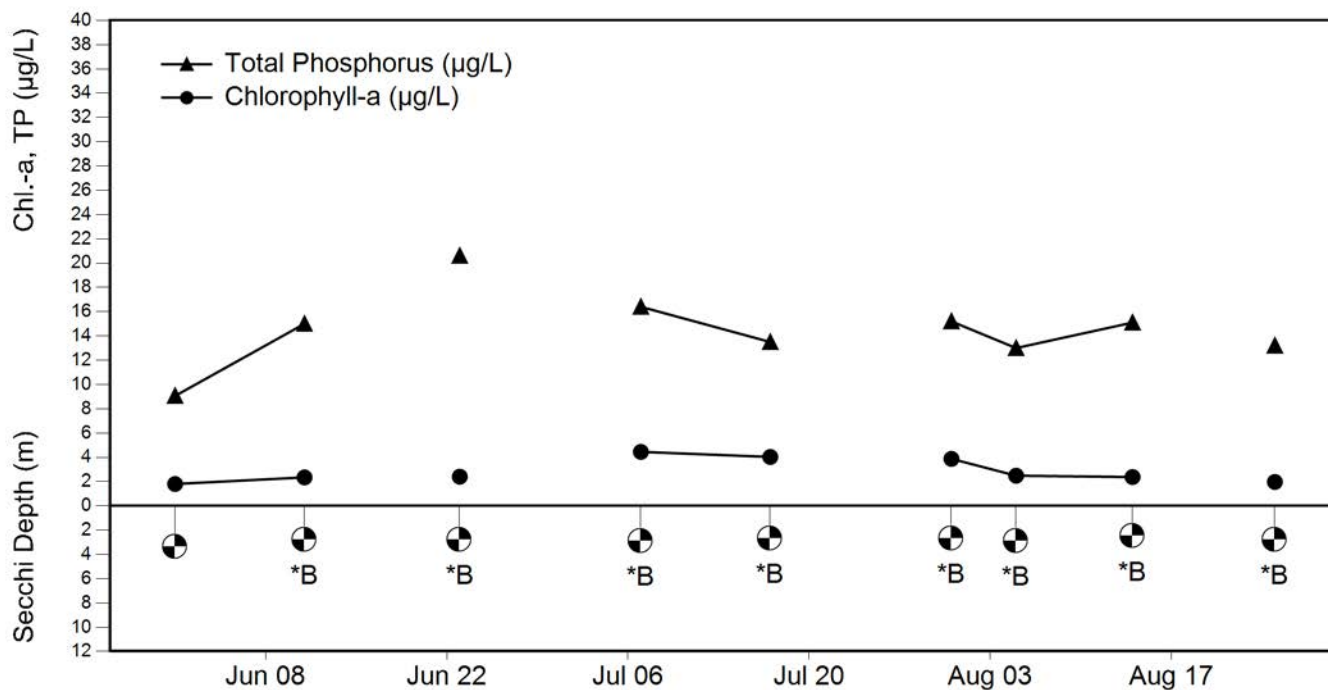
Lake Surface Area: 61 acres  
 Drainage Basin Area: 647 acres  
 Ratio (Basin:Lake): 11:1  
 Maximum Depth: 13 ft (4.0 m)  
 Mean Depth: 8 ft (2.4 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m) *B	9	2.2	2.6	3.4
Chl-a (µg/L)	9	1.7	2.9	4.5
Summer TP (µg/L)	9	9.1	14.6	20.6



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# FOSTERS POND

## Annual Data

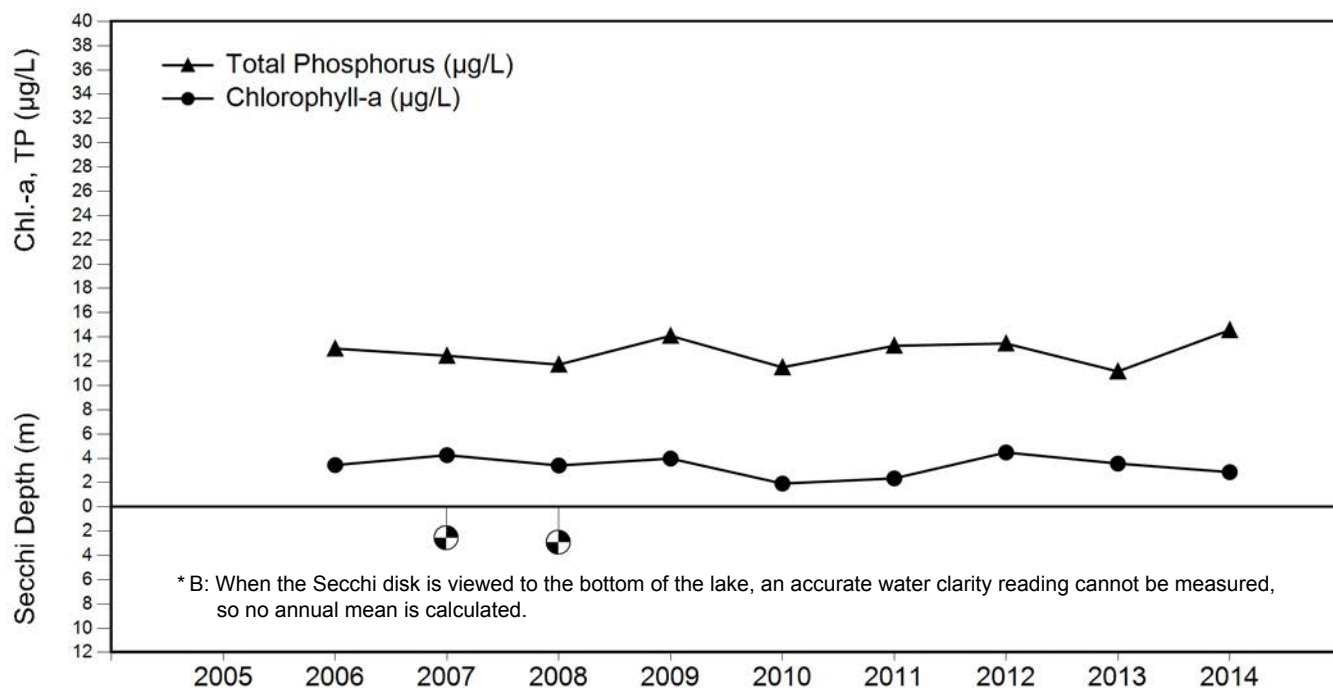
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1989					7.0
1979					6.0
1991					7.0
1990					4.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1998					5.7
2003					8.7
2004					9.0
2005	8	*B			
2006	10	*B	3.4	13.0	10.8
2007	9	2.6	4.3	12.5	8.5
2008	10	2.9	3.4	11.7	7.7
2009	9	*B	4.0	14.1	
2010	9	*B	1.9	11.5	
2011	10	*B	2.3	13.3	
2012	9	*B	4.5	13.5	
2013	9	*B	3.6	11.2	
2014	9	*B	2.9	14.6	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# GREAT HOSMER POND

Craftsbury and Albany, VT

**Lay Monitors:** John Brodhead, Elizabeth Sonshine, Susan Dunklee

**Former Lay** Amy Glen

**Monitors:** Luc Brodhead

## Physical

Great Hosmer is a moderately sized, long, narrow, relatively deep lake.

Lake Surface Area: 140 acres

Drainage Basin Area: 860 acres

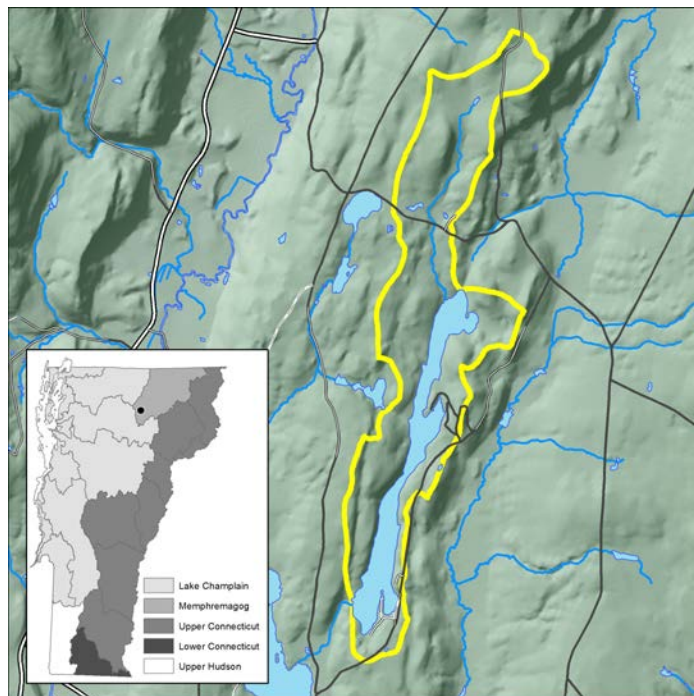
Ratio (Basin:Lake): 6:1

Maximum Depth: 57 ft (17.4 m)

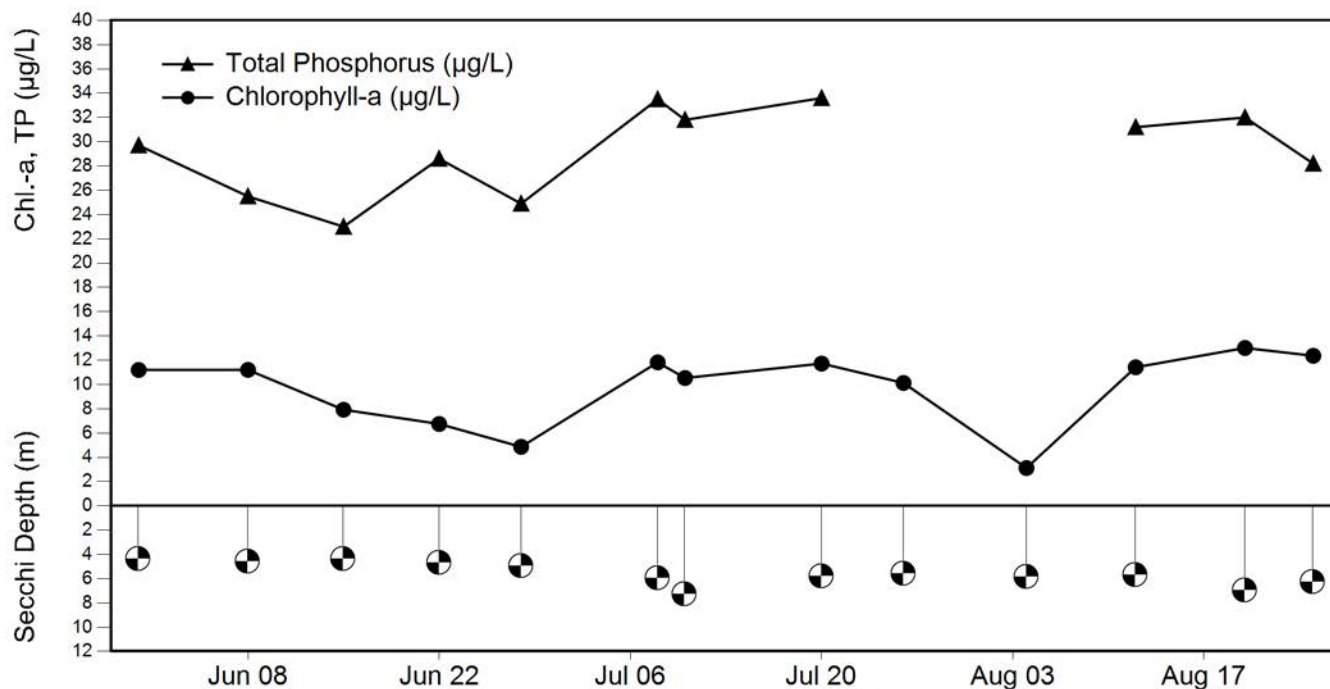
Mean Depth: 20 ft (6.1 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	13	4.2	5.5	7.3
Chl-a ( $\mu\text{g/L}$ )	13	3.0	9.7	15.6
Summer TP ( $\mu\text{g/L}$ )	11	23.0	29.3	33.6



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# GREAT HOSMER POND

## Annual Data

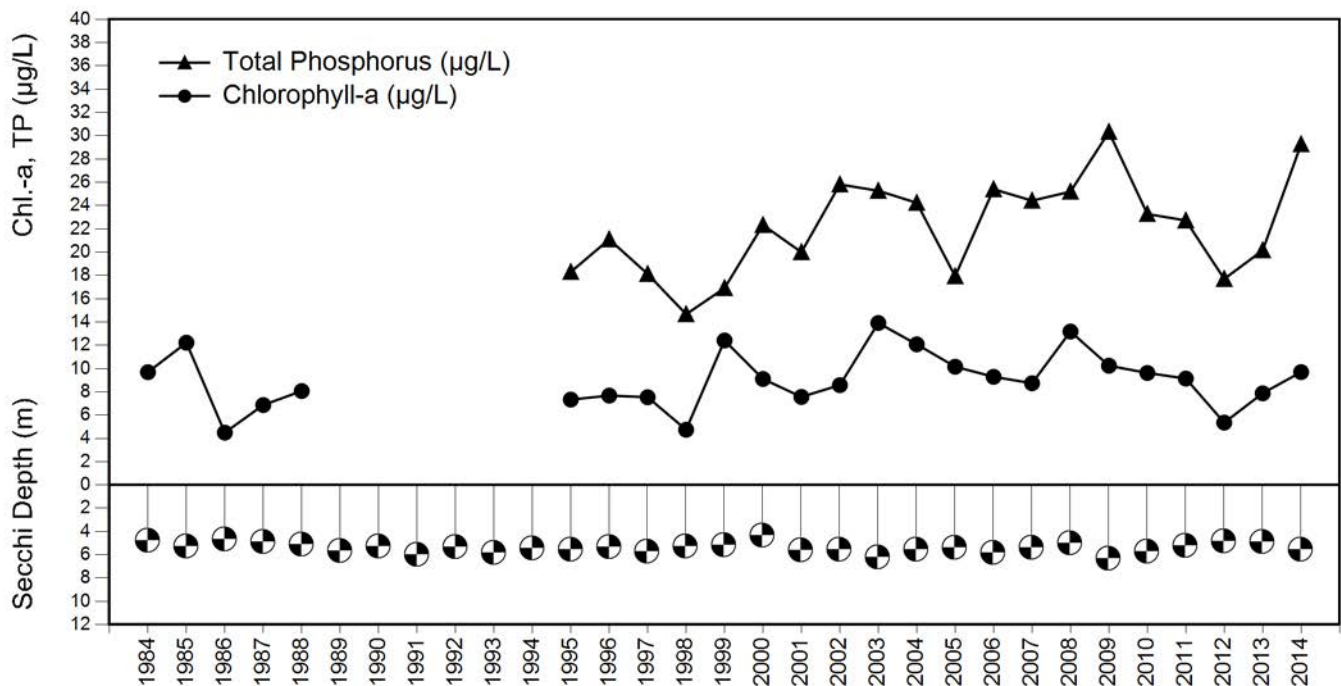
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1984	13	4.8	9.7		23.0
1985	13	5.3	12.2		24.0
1986	14	4.7	4.5		
1987	13	4.9	6.9		
1988	11	5.2	8.1		
1989	12	5.7			
1990	11	5.3			23.0
1991	11	6.0			
1992	8	5.4			
1993	6	5.8			
1994	10	5.4			
1995	10	5.6	7.3	18.3	
1996	10	5.3	7.7	21.1	
1979					13.0
1981					25.0
1983					26.0
1982					26.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	8	5.7	7.5	18.1	21.0
1998	9	5.3	4.7	14.7	
1999	11	5.2	12.4	16.9	
2000	9	4.4	9.1	22.3	
2001	9	5.6	7.6	20.0	
2002	11	5.6	8.6	25.8	16.3
2003	11	6.2	13.9	25.3	
2004	10	5.6	12.1	24.2	19.0
2005	9	5.4	10.2	17.9	
2006	10	5.9	9.3	25.4	
2007	9	5.4	8.7	24.4	20.6
2008	9	5.0	13.2	25.2	
2009	11	6.3	10.2	30.3	
2010	11	5.7	9.6	23.3	
2011	12	5.2	9.1	22.7	
2012	11	4.9	5.4	17.7	
2013	11	4.9	7.9	20.2	21.8
2014	13	5.6	9.7	29.3	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# GREEN RIVER RESERVOIR

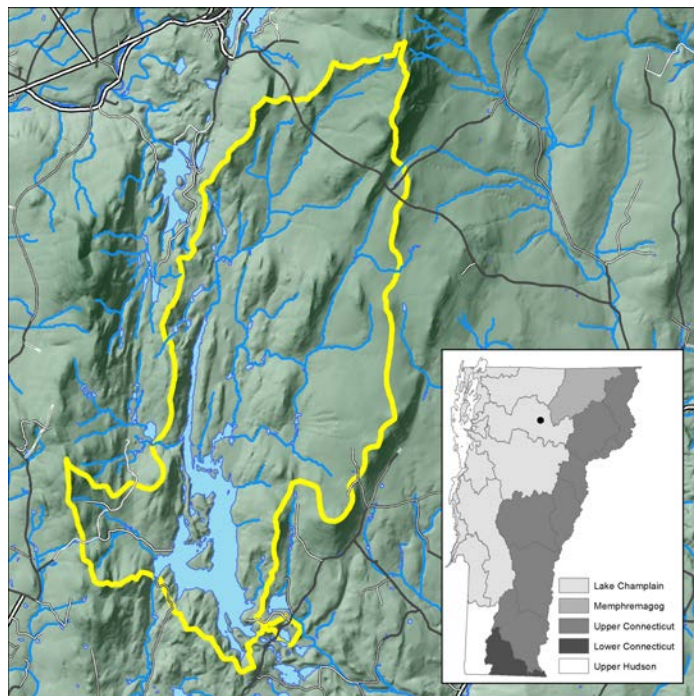
Hyde Park, VT

**Lay Monitor:** Shannon Blake  
**Former Lay Monitors:** Sharlotte Williams, Lucas Griggs, Michale McAtee, Ryan Harlow & Thomas Gregory, Jason Kelly & Harry Dunn-Davenport, Teery & Bonnie Francis, Heather Thomas, Debbie Benjamin, Terri Gregory

## Physical

Green River Reservoir is a large, artificial, warmwater lake.

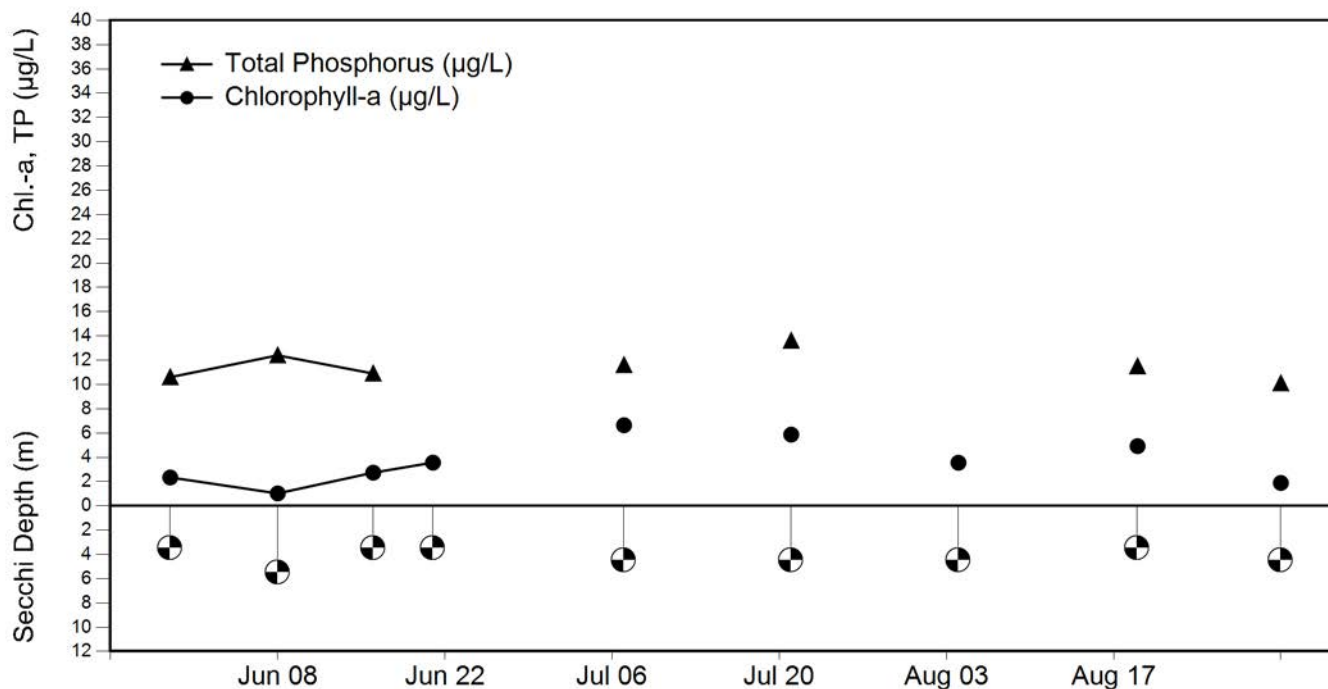
Lake Surface Area: 554 acres  
 Drainage Basin Area: 9,075 acres  
 Ratio (Basin:Lake): 16:1  
 Maximum Depth: 93 ft (28.3 m)



## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	3.5	4.2	5.5
Chl-a ( $\mu\text{g/L}$ )	9	0.8	3.6	8.8
Summer TP ( $\mu\text{g/L}$ )	7	10.1	11.5	13.6

## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# GREEN RIVER RESERVOIR

## Annual Data

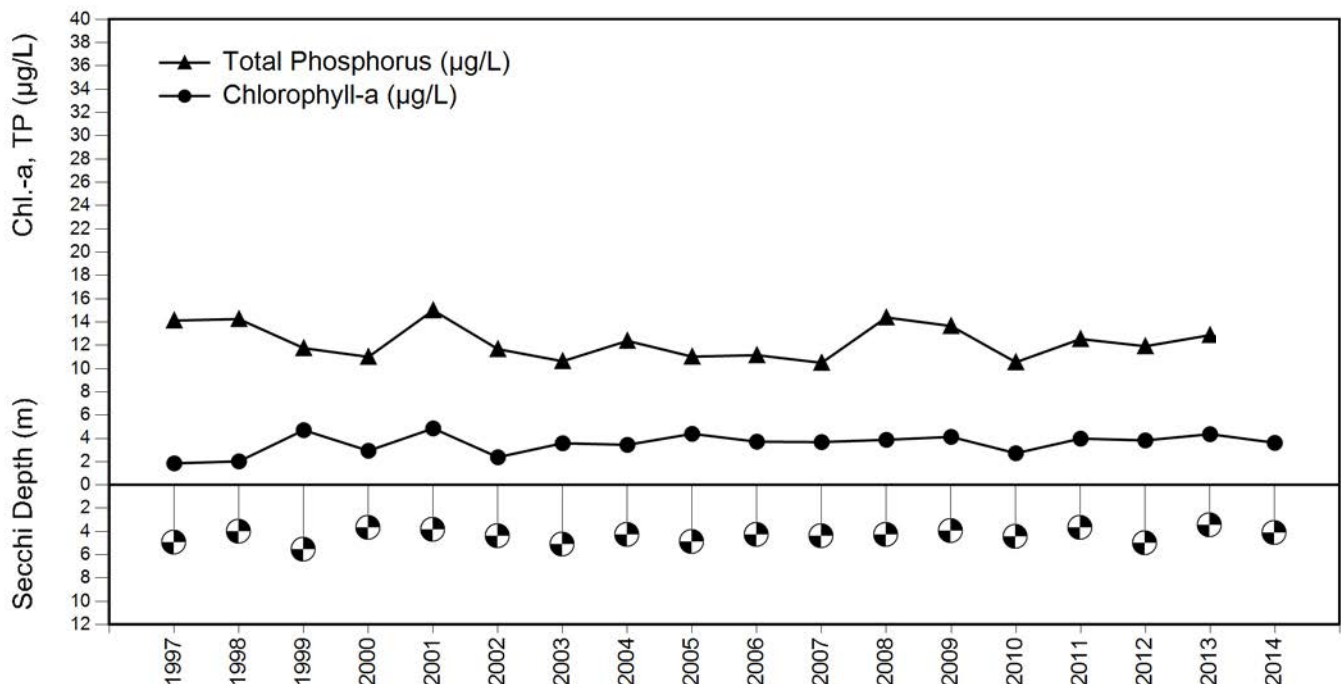
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1987					11.0
1980					4.0
1989					11.0
1986					8.0
1991					12.0
1990					9.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	8	4.9	1.9	14.1	
1998	8	4.0	2.0	14.3	8.3
1999	8	5.6	4.7	11.8	10.0
2000	9	3.7	2.9	11.0	
2001	8	3.9	4.9	15.0	
2002	9	4.4	2.4	11.7	
2003	9	5.2	3.6	10.6	
2004	12	4.3	3.4	12.4	
2005	10	4.9	4.4	11.0	10.8
2006	10	4.3	3.7	11.1	
2007	11	4.4	3.7	10.5	14.7
2008	11	4.3	3.9	14.4	
2009	11	4.0	4.1	13.7	
2010	11	4.5	2.7	10.5	
2011	13	3.7	4.0	12.5	12.2
2012	12	5.0	3.8	11.9	
2013	5	3.5	4.4	12.9	
2014	9	4.2	3.6	11.5	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE GROTON

## Groton, VT

**Lay Monitor:** John LaRosa  
**Former Lay Monitors:** Jamie and Cathy Donath  
 Diana & Bob Rudd  
 Milton Lamberton

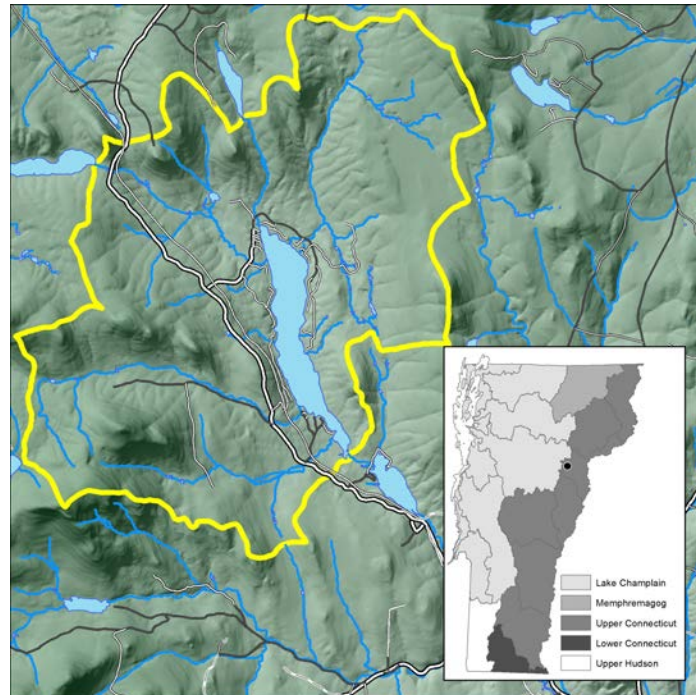
## Physical

Lake Groton is a large, shallow, warmwater lake.

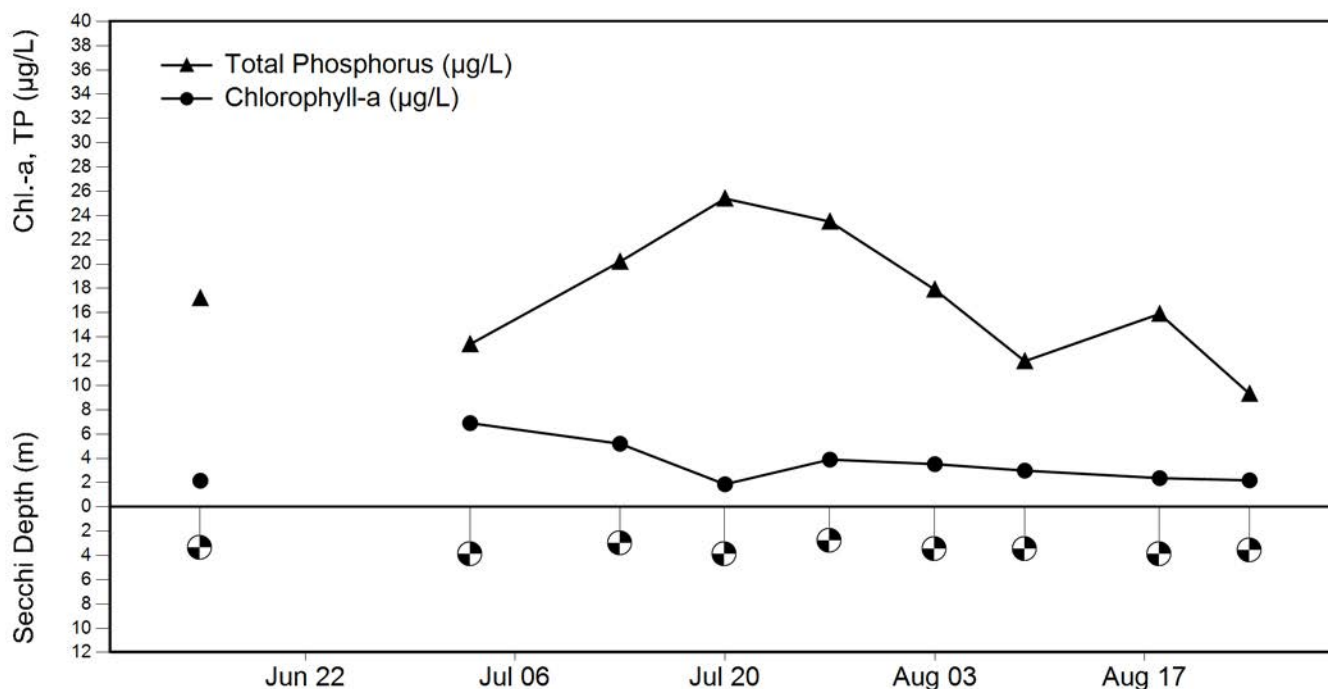
Lake Surface Area: 422 acres  
 Drainage Basin Area: 12,006 acres  
 Ratio (Basin:Lake): 29:1  
 Maximum Depth: 35 ft (10.7 m)  
 Mean Depth: 13 ft (4.0 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	10	2.5	3.4	3.9
Chl-a ( $\mu\text{g/L}$ )	9	0.9	3.5	7.8
Summer TP ( $\mu\text{g/L}$ )	9	9.3	17.2	25.4



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE GROTON

## Annual Data

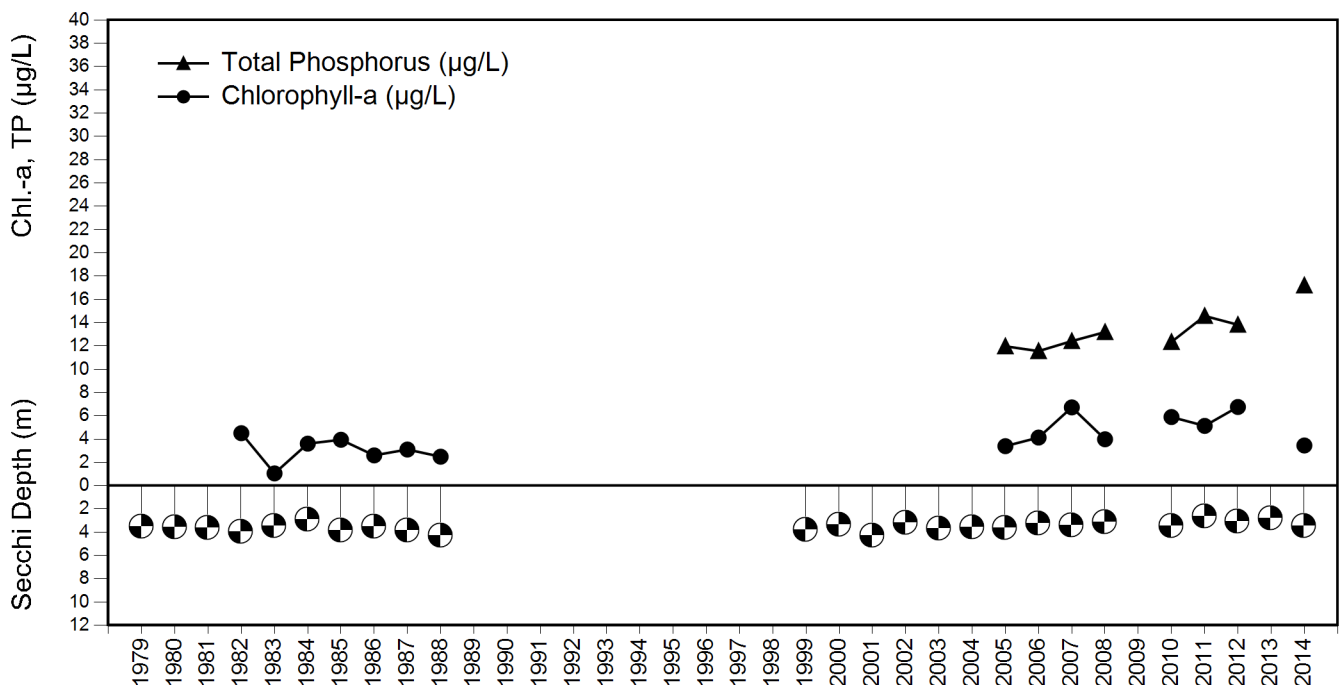
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	6	3.6			6.0
1980	10	3.6			12.0
1981	9	3.7			8.0
1982	12	4.0	4.5		10.0
1983	4	3.5	1.1		9.0
1984	13	3.0	3.6		7.0
1985	13	3.9	3.9		6.0
1986	14	3.5	2.6		8.0
1987	14	3.9	3.1		15.0
1988	21	4.3	2.5		
1994					6.7

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1999	12	3.8			7.0
2000	10	3.4			
2001	11	4.3			
2002	8	3.2			
2003	8	3.7			
2004	9	3.6			
2005	9	3.6	3.4	12.0	9.1
2006	9	3.3	4.1	11.6	9.7
2007	10	3.4	6.7	12.4	
2008	10	3.1	4.0	13.2	
2010	9	3.5	5.9	12.3	
2011	9	2.6	5.1	14.6	
2012	9	3.1	6.8	13.8	
2013	3	2.8			9.2
2014	9	3.5	3.5	17.2	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# HALLS LAKE

Newbury, VT

**Lay Monitor:** Jeff MacQueen  
**Former Lay Monitors:** Joe & Mike Dekens  
 Albert Wright

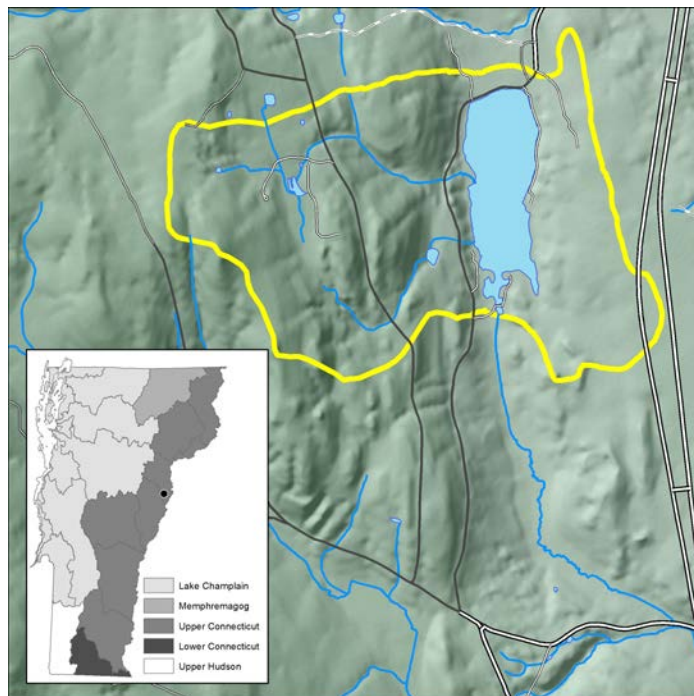
## Physical

Halls Lake is a small, shallow, warmwater lake.

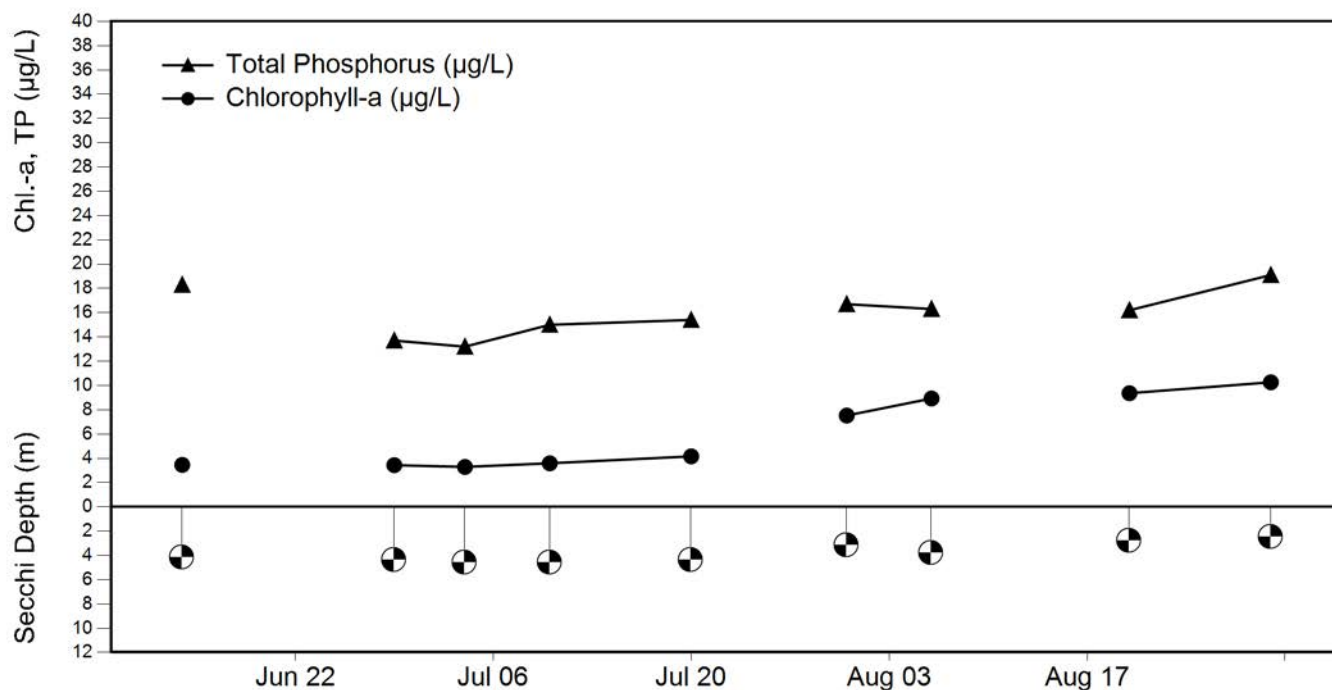
Lake Surface Area: 85 acres  
 Drainage Basin Area: 561 acres  
 Ratio (Basin:Lake): 7:1  
 Maximum Depth: 30 ft (9.1 m)  
 Mean Depth: 17 ft (5.2 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	2.5	3.9	4.8
Chl-a ( $\mu\text{g/L}$ )	9	1.5	6.0	10.7
Summer TP ( $\mu\text{g/L}$ )	9	13.2	16.0	19.1
Spring TP ( $\mu\text{g/L}$ )	1		17.2	



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# HALLS LAKE

## Annual Data

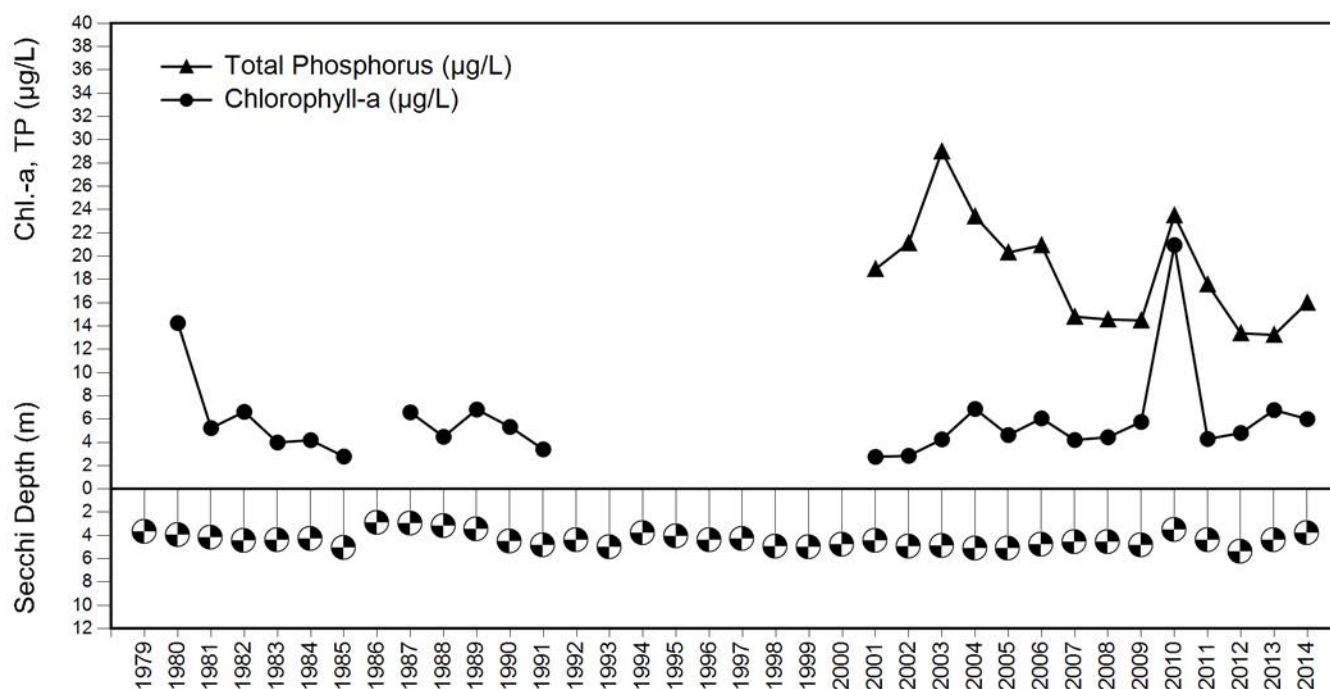
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	14	3.7			5.0
1980	10	4.0	14.3		9.0
1981	12	4.2	5.2		19.0
1982	10	4.5	6.6		12.0
1983	9	4.4	4.0		19.0
1984	12	4.3	4.2		14.0
1985	11	5.1	2.8		12.0
1986	12	3.0			13.0
1987	13	3.0	6.6		13.0
1988	14	3.2	4.5		
1989	10	3.5	6.8		
1990	11	4.5	5.3		16.0
1991	16	4.9	3.4		
1992	9	4.4			
1993	11	5.0			
1994	10	3.8			
1995	11	4.1			
1996	11	4.4			

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	11	4.3			12.0
1998	10	5.0			
1999	14	5.0			
2000	14	4.8			
2001	9	4.5	2.8	18.9	
2002	9	5.0	2.8	21.1	15.0
2003	9	4.9	4.3	29.0	
2004	9	5.1	6.9	23.4	17.3
2005	9	5.2	4.6	20.3	18.4
2006	9	4.8	6.1	20.9	19.9
2007	9	4.6	4.2	14.8	
2008	9	4.6	4.4	14.6	
2009	9	4.9	5.8	14.5	22.9
2010	9	3.5	21.0	23.5	25.6
2011	9	4.4	4.3	17.6	16.4
2012	9	5.4	4.8	13.4	
2013	9	4.4	6.8	13.2	
2014	9	3.8	6.0	16.0	17.2

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# HARVEY'S LAKE

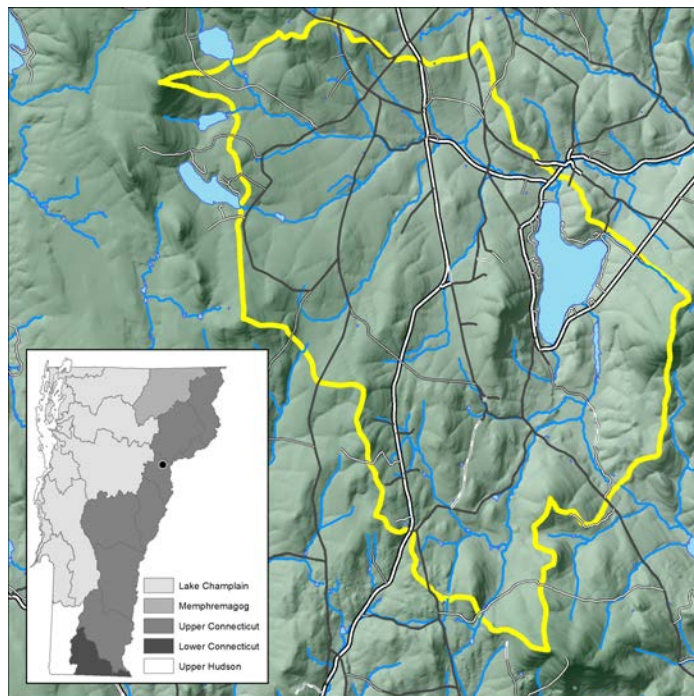
Barnett, VT

**Lay Monitor:** Phil Sorrentino  
**Former Lay Monitors:** Steve Mills  
 Jackie Sprague  
 Wayne Berge  
 Ruth Anderson  
 Jean Hall Bouffard  
 Leon & Marilyn Rank

## Physical

Harvey's Lake is a large, deep, coldwater lake.

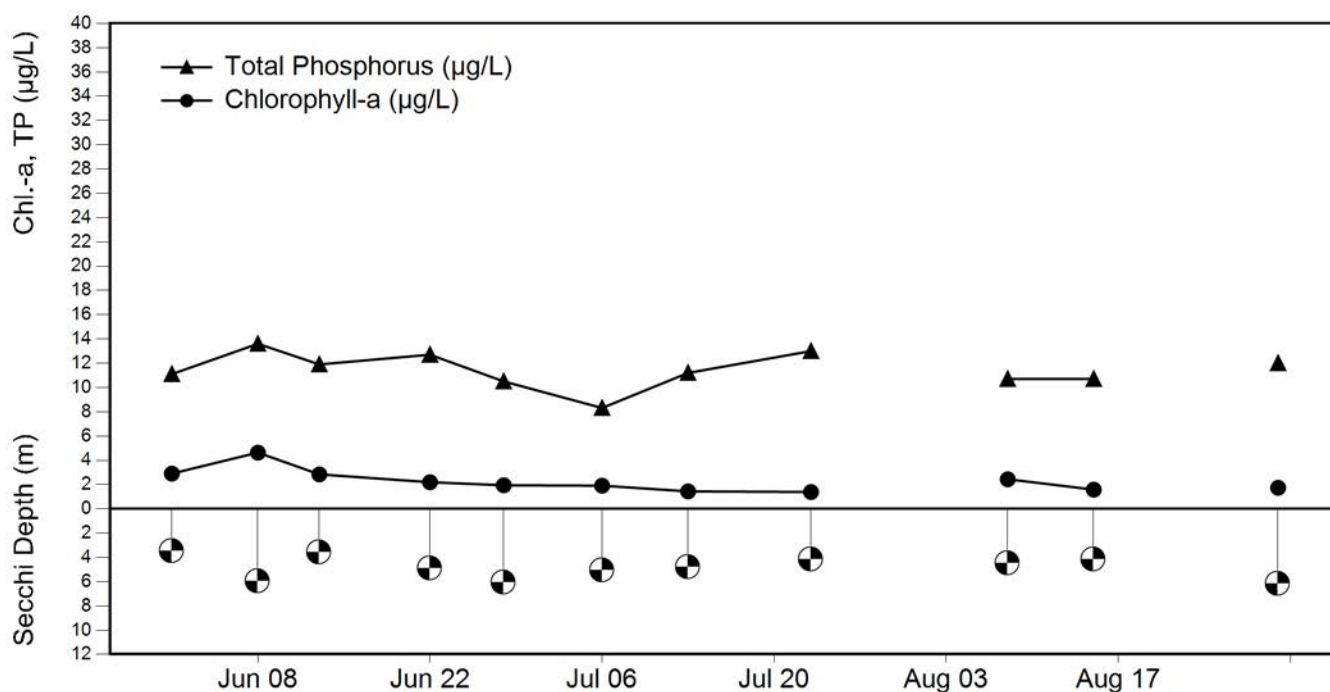
Lake Surface Area: 351 acres  
 Drainage Basin Area: 5,364 acres  
 Ratio (Basin:Lake): 15:1  
 Maximum Depth: 145 ft (44.2 m)  
 Mean Depth: 66 ft (20.1 m)



## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	12	3.5	4.6	6.2
Chl-a ( $\mu\text{g/L}$ )	11	0.9	2.3	4.7
Summer TP ( $\mu\text{g/L}$ )	11	8.3	11.4	13.6

## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# HARVEY'S LAKE

## Annual Data

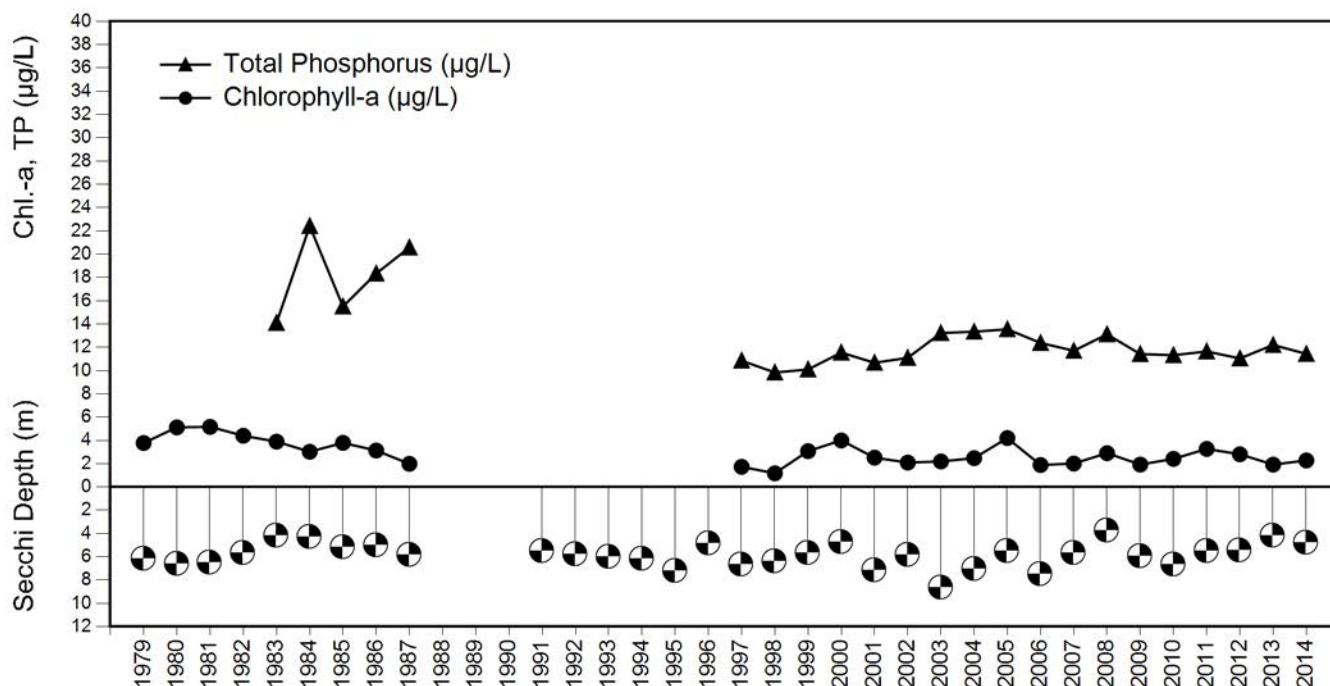
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	14	6.2	3.8		14.0
1980	13	6.6	5.1		17.0
1981	12	6.5	5.2		16.0
1982	11	5.7	4.4		15.0
1983	12	4.2	3.9	14.1	13.0
1984	12	4.3	3.0	22.4	13.0
1985	6	5.2	3.8	15.5	13.0
1986	12	5.0	3.1	18.3	10.0
1987	7	5.9	2.0	20.6	11.0
1991	13	5.5			11.0
1992	12	5.8			9.0
1993	12	6.0			9.5
1994	11	6.2			9.3
1995	9	7.2			11.3
1996	11	4.9			
1988					10.0
1990					9.0
1989					16.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	13	6.7	1.7	10.8	8.3
1998	12	6.4	1.2	9.8	8.3
1999	11	5.7	3.1	10.1	10.7
2000	11	4.8	4.0	11.5	11.0
2001	7	7.2	2.5	10.7	10.3
2002	11	5.9	2.1	11.1	8.3
2003	9	8.7	2.2	13.2	
2004	9	7.1	2.5	13.3	11.0
2005	9	5.5	4.2	13.5	13.1
2006	9	7.5	1.9	12.4	11.6
2007	9	5.7	2.0	11.7	14.8
2008	9	3.8	2.9	13.1	
2009	12	6.0	1.9	11.4	11.3
2010	12	6.7	2.4	11.3	
2011	9	5.5	3.3	11.6	
2012	9	5.5	2.8	11.0	
2013	9	4.2	1.9	12.2	
2014	11	4.8	2.3	11.4	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# HOLLAND POND

Holland, VT

**Lay Monitors:** Tom Fetter & Chris Owen

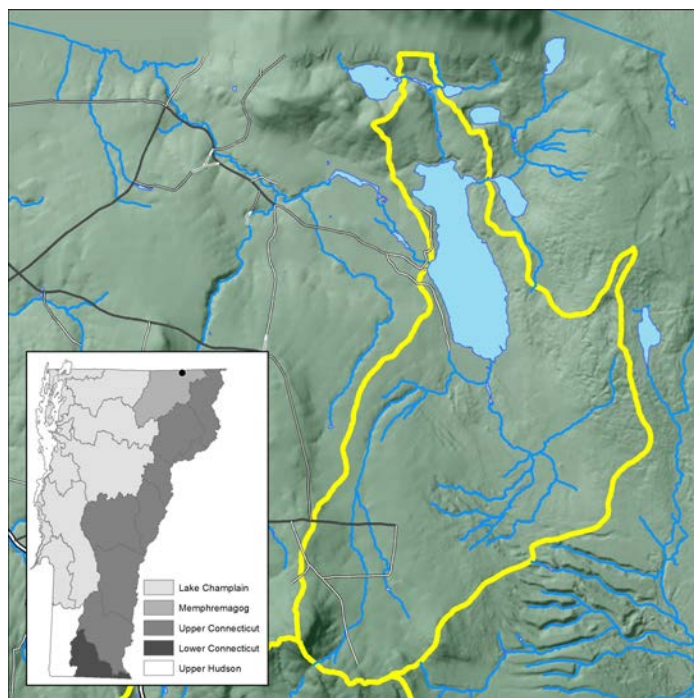
## Physical

Holland Pond is a relatively large, coldwater lake with little shoreland development.

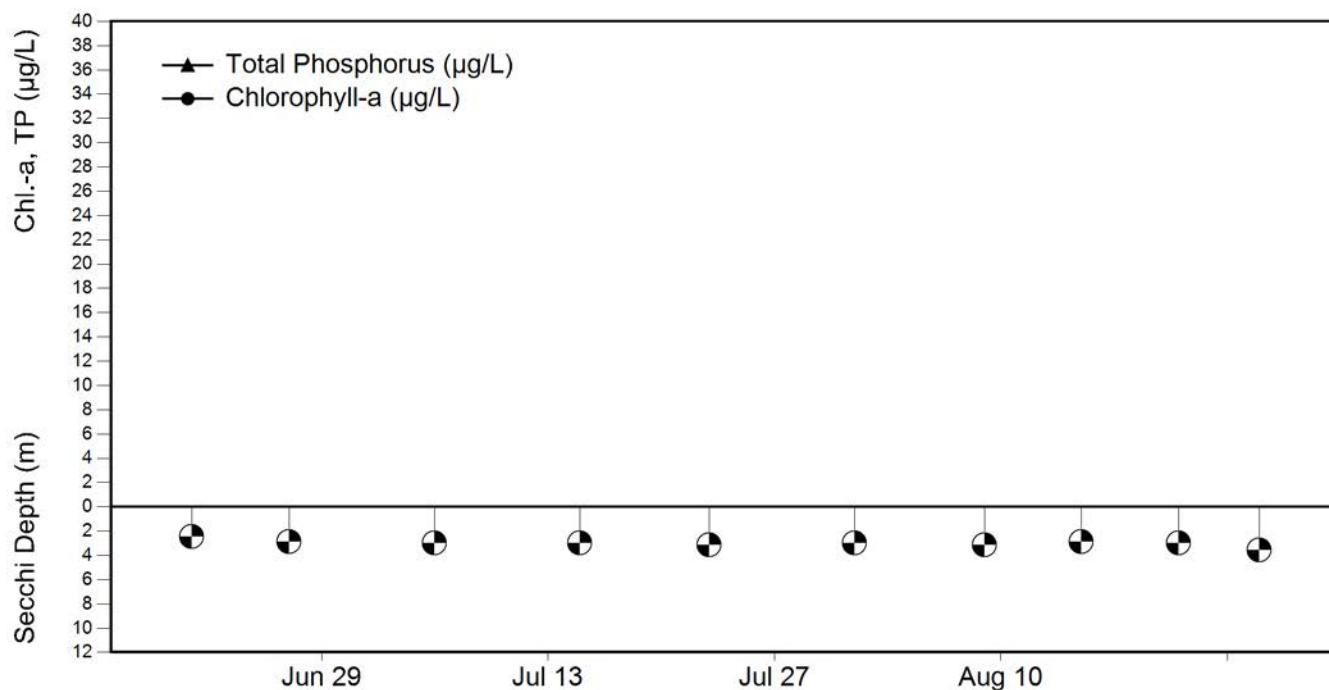
Lake Surface Area: 325 acres  
 Drainage Basin Area: 4,431 acres  
 Ratio (Basin:Lake): 14:1  
 Maximum Depth: 39 ft (11.9 m)  
 Mean Depth: 17 ft (5.2 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	10	2.5	3.0	3.6
Spring TP ( $\mu\text{g/L}$ )	1		14.2	



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# HOLLAND POND

## Annual Data

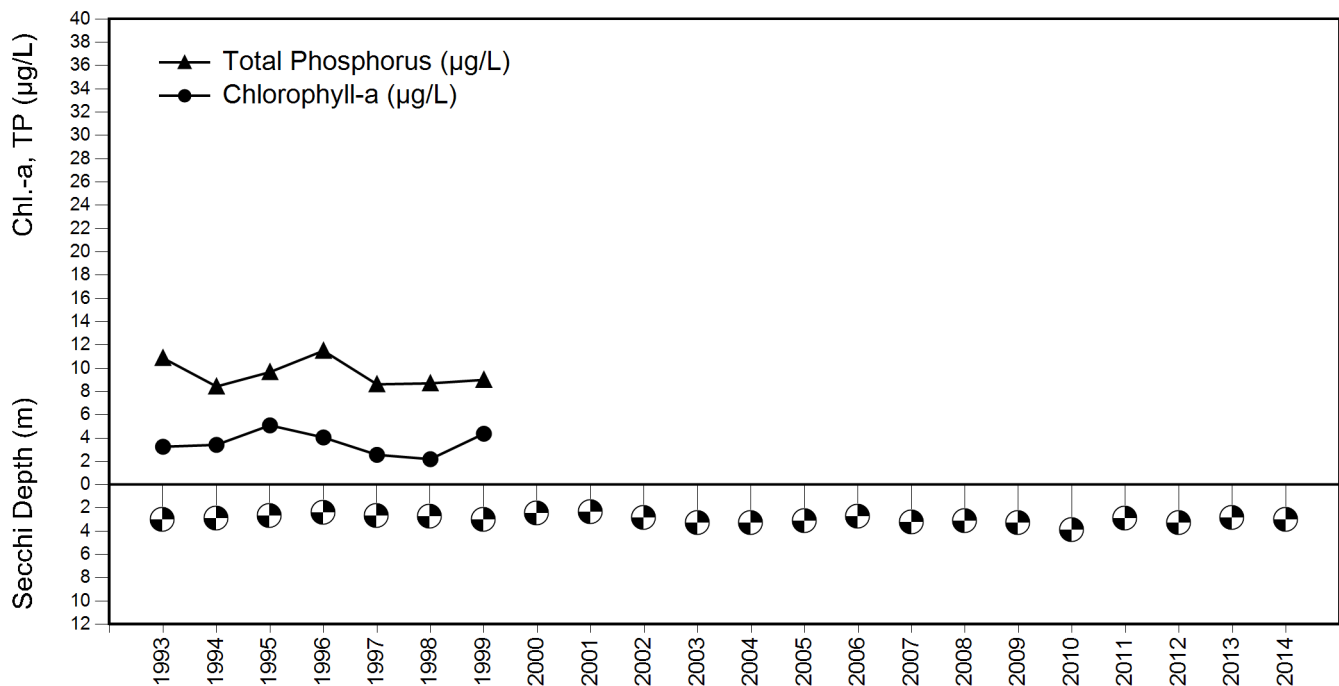
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1993	9	3.0	3.3	10.9	
1994	8	3.0	3.4	8.4	5.3
1995	6	2.7	5.1	9.7	8.0
1996	10	2.4	4.1	11.5	
1981					5.0
1983					8.0
1985					7.0
1982					7.0
1979					3.0
1986					8.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	13	2.7	2.6	8.6	
1998	10	2.8	2.2	8.7	7.0
1999	12	3.0	4.4	9.0	8.7
2000	10	2.5			
2001	11	2.4			
2002	11	2.9			
2003	10	3.3			7.0
2004	9	3.3			
2005	12	3.2			
2006	10	2.7			
2007	11	3.3			8.7
2008	10	3.2			
2009	9	3.3			8.4
2010	10	3.9			9.5
2011	10	2.9			
2012	9	3.3			10.7
2013	8	2.9			9.7
2014	10	3.0			14.2

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# INDIAN BROOK RESERVOIR

Essex, VT

**Lay Monitor:** Beth Glaspie  
**Former Lay Monitors:** Kate Crawford & Garnet Smith

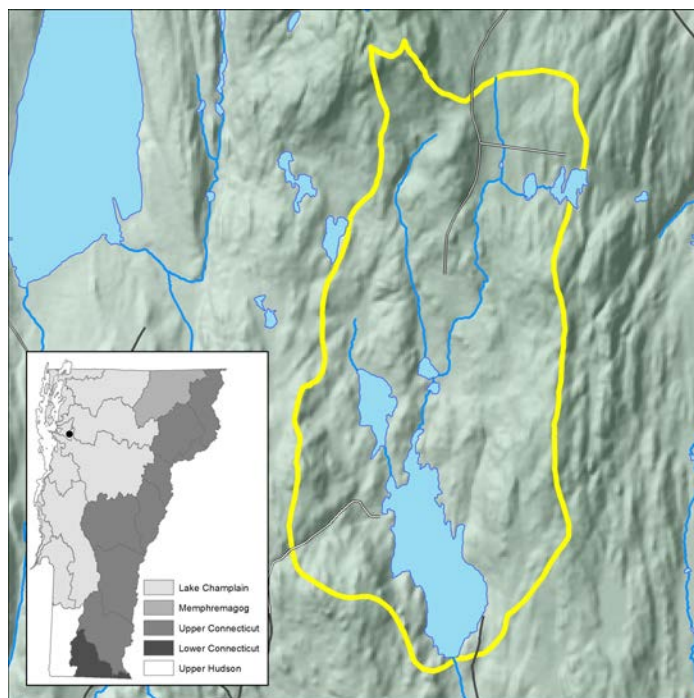
## Physical

Indian Brook Reservoir is a small, warmwater lake.

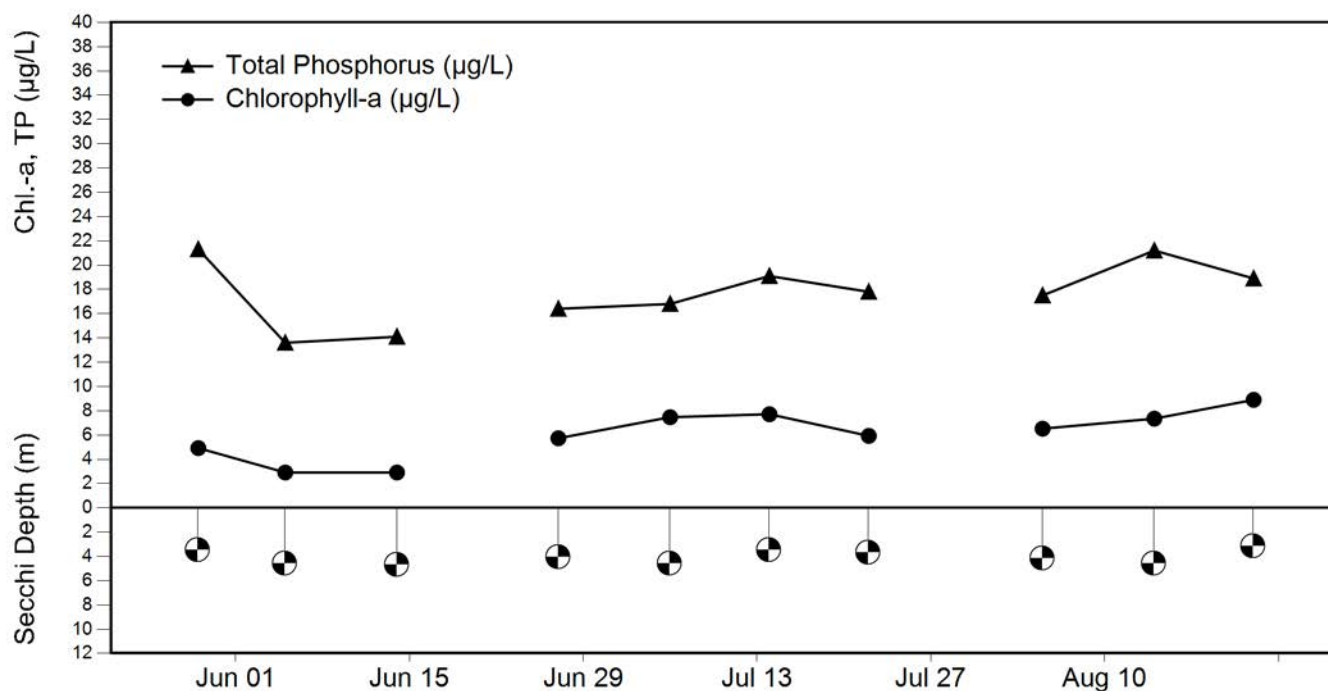
Lake Surface Area: 50 acres  
 Drainage Basin Area: 761 acres  
 Ratio (Basin:Lake): 15:1  
 Maximum Depth: 22 ft (6.7 m)  
 Mean Depth: 13 ft (4.0 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	10	2.5	3.9	4.7
Chl-a ( $\mu\text{g/L}$ )	10	2.6	6.0	9.9
Summer TP ( $\mu\text{g/L}$ )	10	13.6	17.7	21.3



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# INDIAN BROOK RESERVOIR

## Annual Data

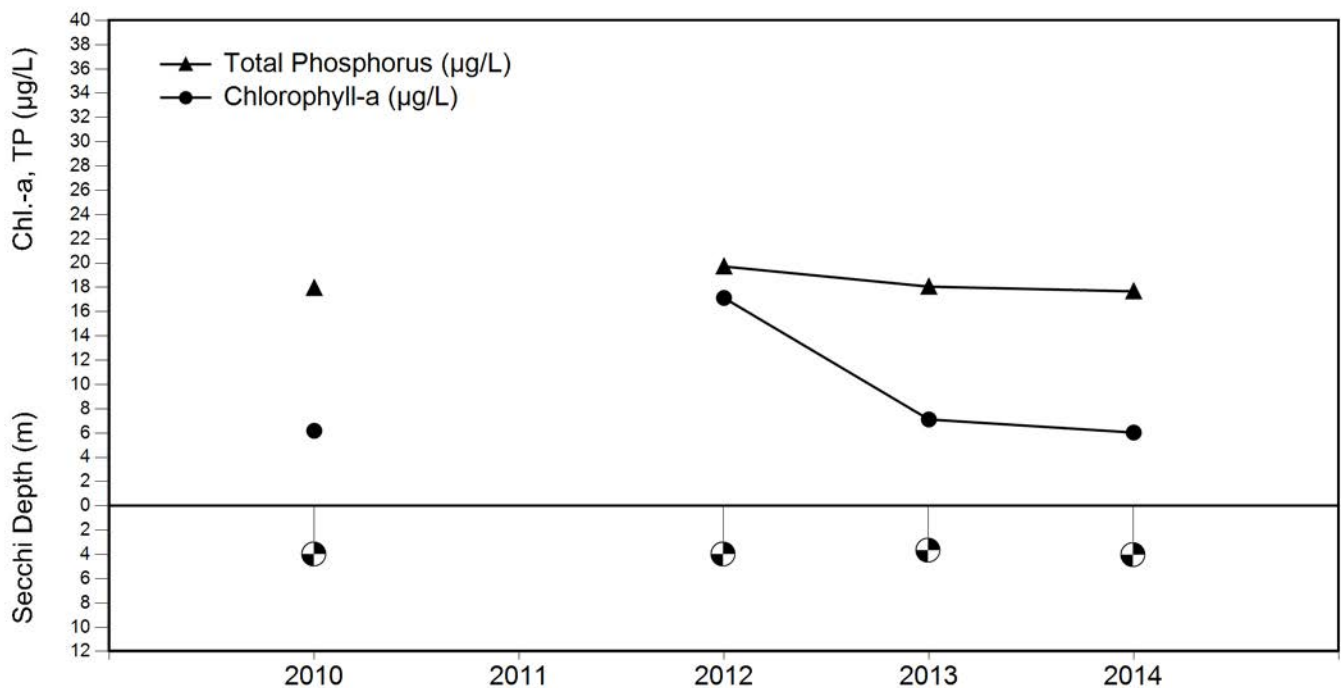
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1990					25.0
1987					25.0
1989					19.0
1986					30.0
1988					31.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997					17.0
1998					15.0
2000					18.3
2009					16.8
2010	10	4.0	6.2	18.0	
2011					15.0
2012	9	4.0	17.1	19.7	
2013	10	3.7	7.1	18.1	
2014	10	4.1	6.0	17.7	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE IROQUOIS

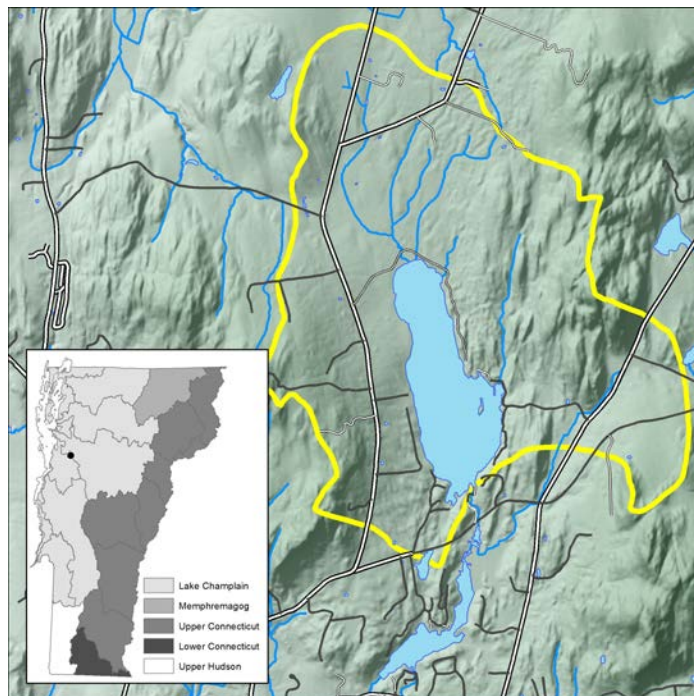
## Williston and Hinesburg, VT

**Lay Monitor:** Dan Sharpe  
**Former Lay Monitors:** Adam Kaminsky  
 Steve Lidle  
 Chip & Joanne Wright  
 Kelli Brown  
 Eric & Ginger Johnson  
 Judy Brook  
 Robert & Helen Hall

### Physical

Lake Iroquois is a relatively large lake. It has a shallow, northern section and a deeper, southern section.

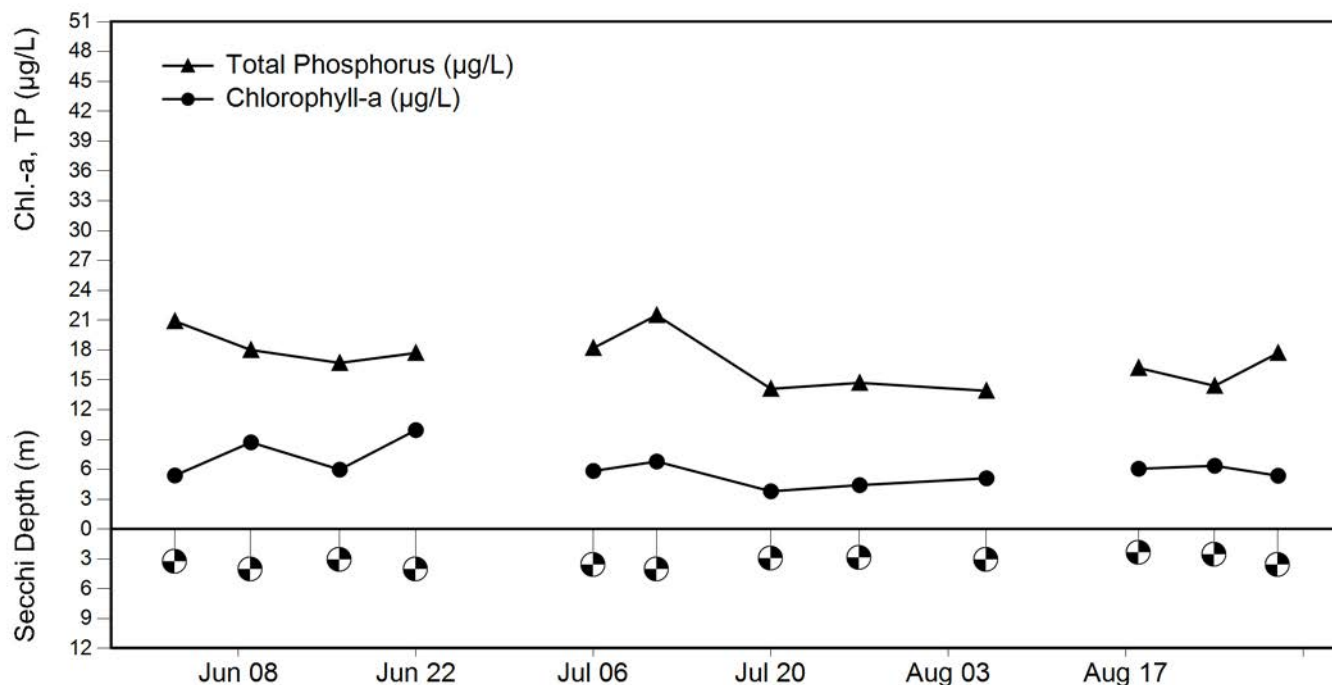
Lake Surface Area: 243 acres  
 Drainage Basin Area: 2,418 acres  
 Ratio (Basin:Lake): 10:1  
 Maximum Depth: 37 ft (11.3 m)  
 Mean Depth: 19 ft (5.8 m)



### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	12	2.4	3.4	4.4
Chl-a ( $\mu\text{g/L}$ )	12	3.3	6.2	11.4
Summer TP ( $\mu\text{g/L}$ )	12	13.9	17.0	21.5

### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE IROQUOIS

## Annual Data

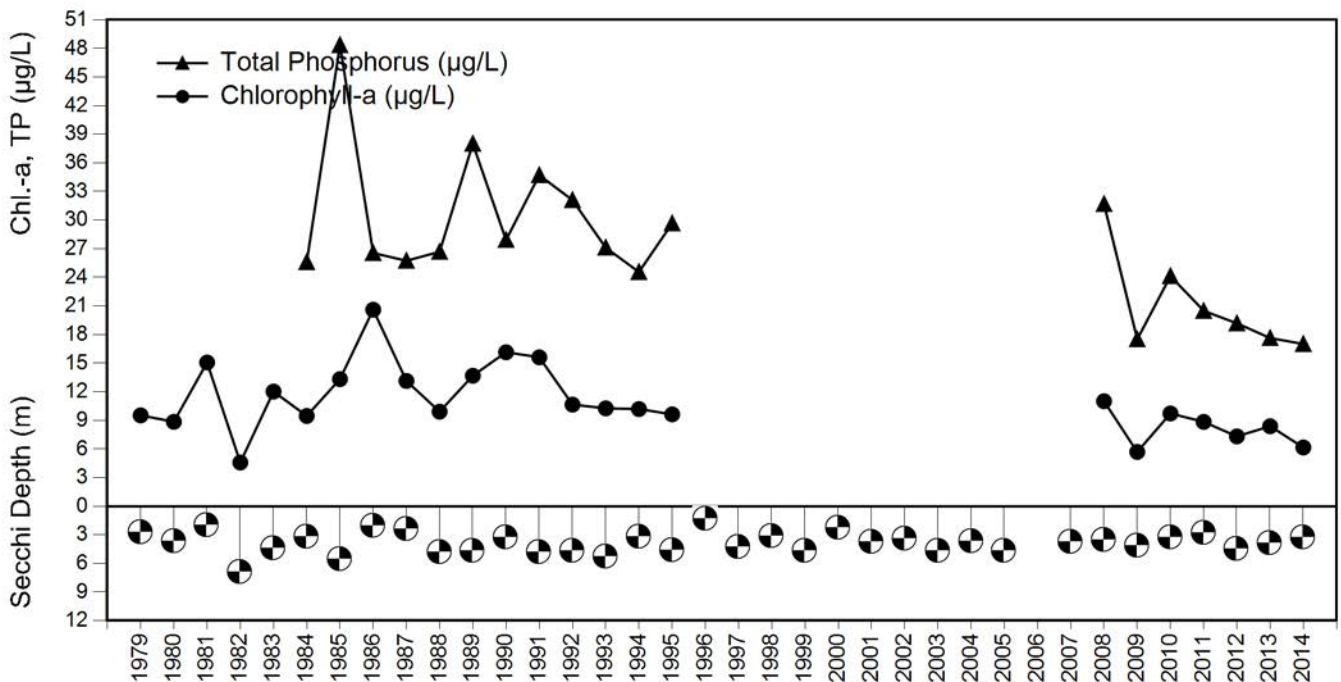
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	12	2.8	9.5		26.0
1980	12	3.7	8.8		30.0
1981	13	2.0	15.1		33.0
1982	11	7.0	4.6		34.0
1983	13	4.4	12.0		26.0
1984	12	3.3	9.5	25.6	26.0
1985	12	5.6	13.3	48.3	29.0
1986	13	2.1	20.6	26.5	26.0
1987	12	2.5	13.1	25.7	30.0
1988	12	4.8	9.9	26.7	31.0
1989	11	4.7	13.7	38.0	40.0
1990	12	3.3	16.1	27.9	30.0
1991	12	4.9	15.6	34.7	23.0
1992	12	4.7	10.6	32.1	34.0
1993	11	5.3	10.3	27.1	28.3
1994	12	3.2	10.2	24.5	41.7
1995	11	4.7	9.6	29.6	25.7
1996	12	1.4			46.7

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	13	4.3			13.7
1998	10	3.2			26.0
1999	12	4.7			20.0
2000	11	2.3			22.7
2001	10	3.7			22.3
2002	10	3.4			15.7
2003	9	4.7			
2004	12	3.7			27.7
2005	9	4.7			
2006					32.3
2007	10	3.8			
2008	14	3.6	11.0	31.7	
2009	14	4.2	5.7	17.5	27.6
2010	10	3.3	9.7	24.1	
2011	10	2.8	8.8	20.5	
2012	13	4.5	7.3	19.2	
2013	12	3.9	8.4	17.6	
2014	12	3.3	6.2	17.0	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# ISLAND POND

Brighton, VT

**Lay Monitors:** George & Patricia Wilcox

**Former Lay Monitors:** Ed Larsen  
Patrick Clarke  
David Molloy

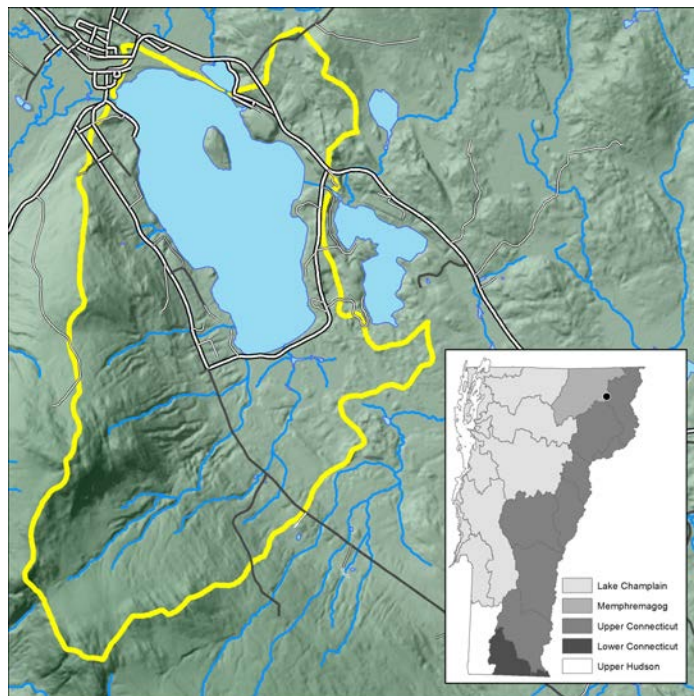
## Physical

Island Pond is a large, warmwater lake with a large island in the middle.

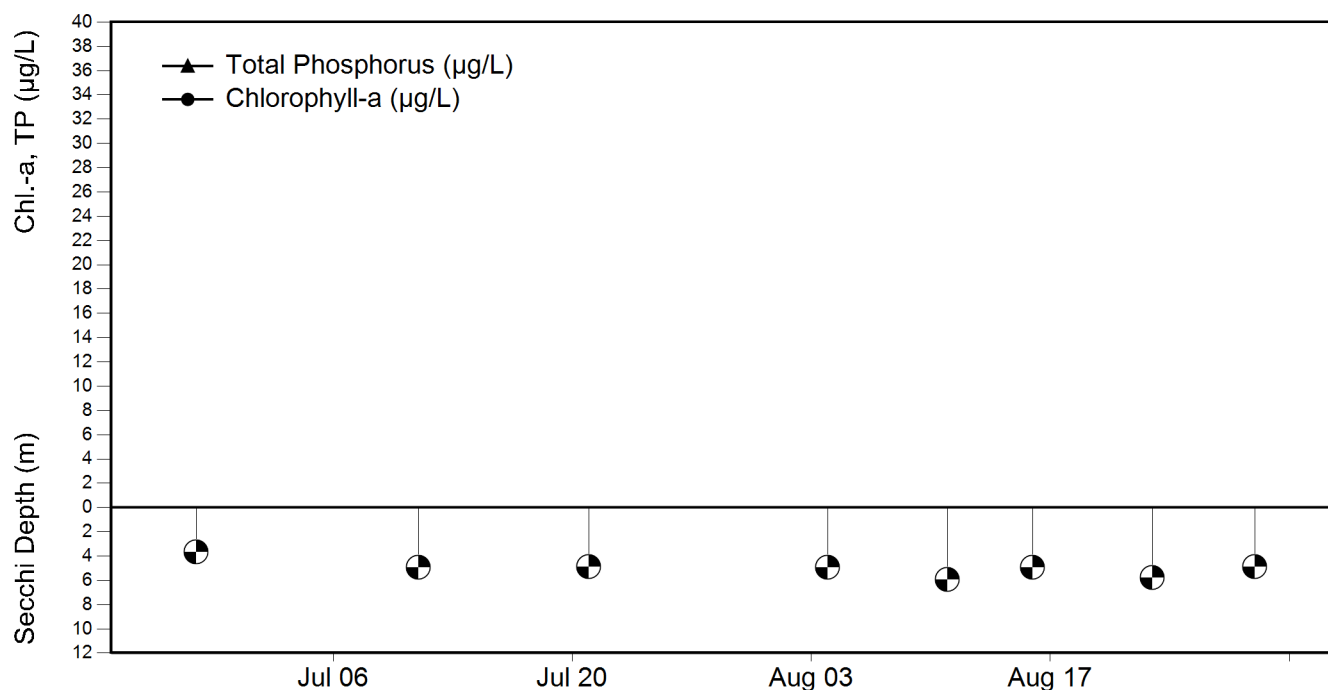
Lake Surface Area: 626 acres  
Drainage Basin Area: 6,295 acres  
Ratio (Basin:Lake): 10:1  
Maximum Depth: 63 ft (19.2 m)  
Mean Depth: 31 ft (9.4 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	8	3.4	5.0	6.0



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# ISLAND POND

## Annual Data

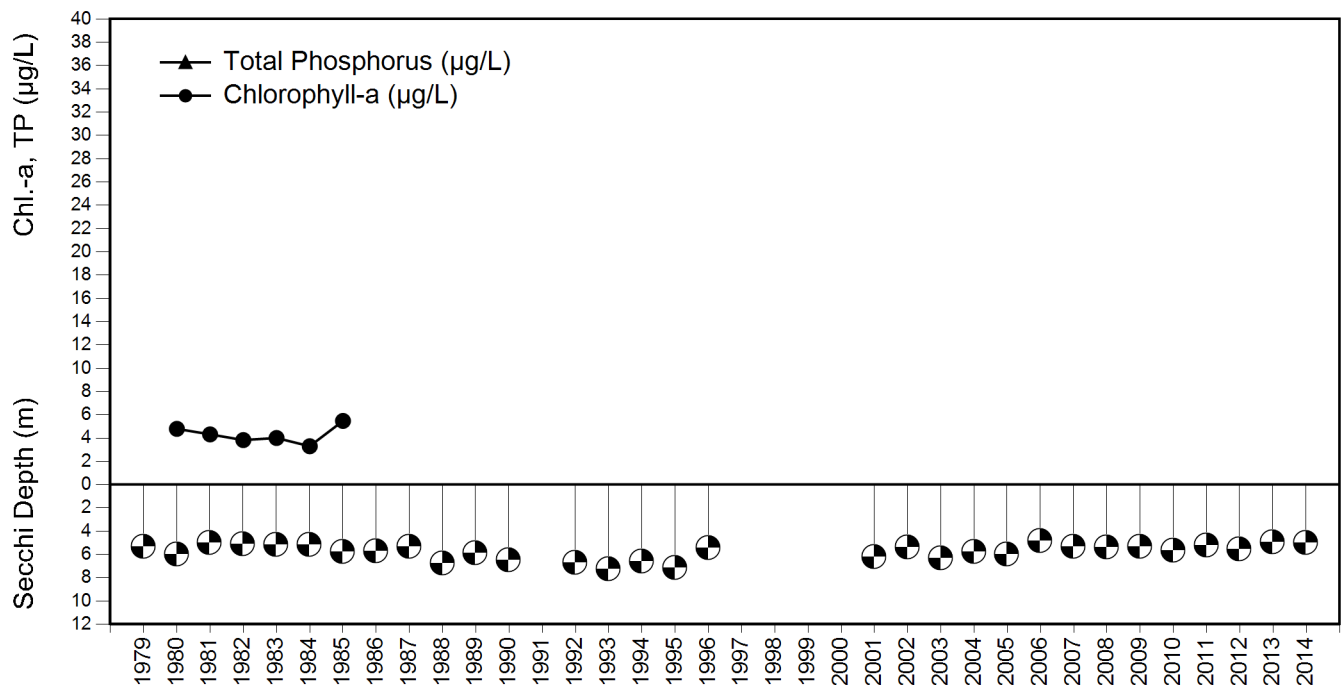
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	4	5.4			3.0
1980	13	6.0	4.8		8.0
1981	11	5.0	4.3		6.0
1982	9	5.2	3.8		8.0
1983	12	5.2	4.0		10.0
1984	12	5.2	3.3		10.0
1985	10	5.8	5.5		10.0
1986	14	5.7			9.0
1987	13	5.4			8.0
1988	12	6.8			
1989	13	5.9			
1990	12	6.5			
1992	11	6.7			
1993	13	7.3			
1994	13	6.6			
1995	13	7.2			7.3
1996	14	5.5			

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
2000	7	*B			
2001	9	6.3			6.0
2002	11	5.4			
2003	8	6.4			
2004	8	5.8			10.7
2005	9	6.0			
2006	9	4.9			
2007	10	5.4			7.5
2008	8	5.4			9.7
2009	9	5.4			13.4
2010	9	5.7			
2011	9	5.3			
2012	9	5.6			
2013	8	5.0			
2014	8	5.0			

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# JOES POND

## Danville and Cabot, VT

**Lay Monitor:** Gina Kurre & Marty Talbot  
**Former Lay Monitors:** James & Marie Dimick  
Maurice Gardner  
Ted Chase

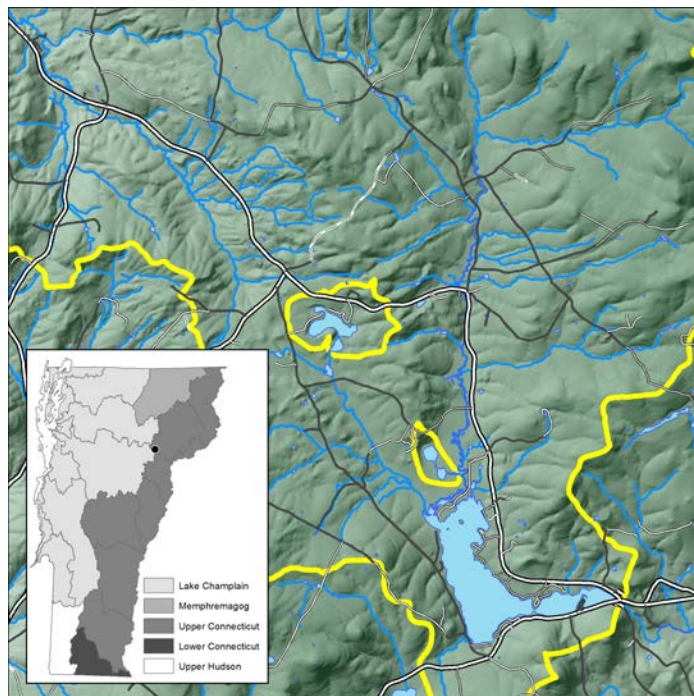
### Physical

Joes Pond is an irregularly-shaped lake comprised of three distinct lake basins connected by narrow, shallow channels.

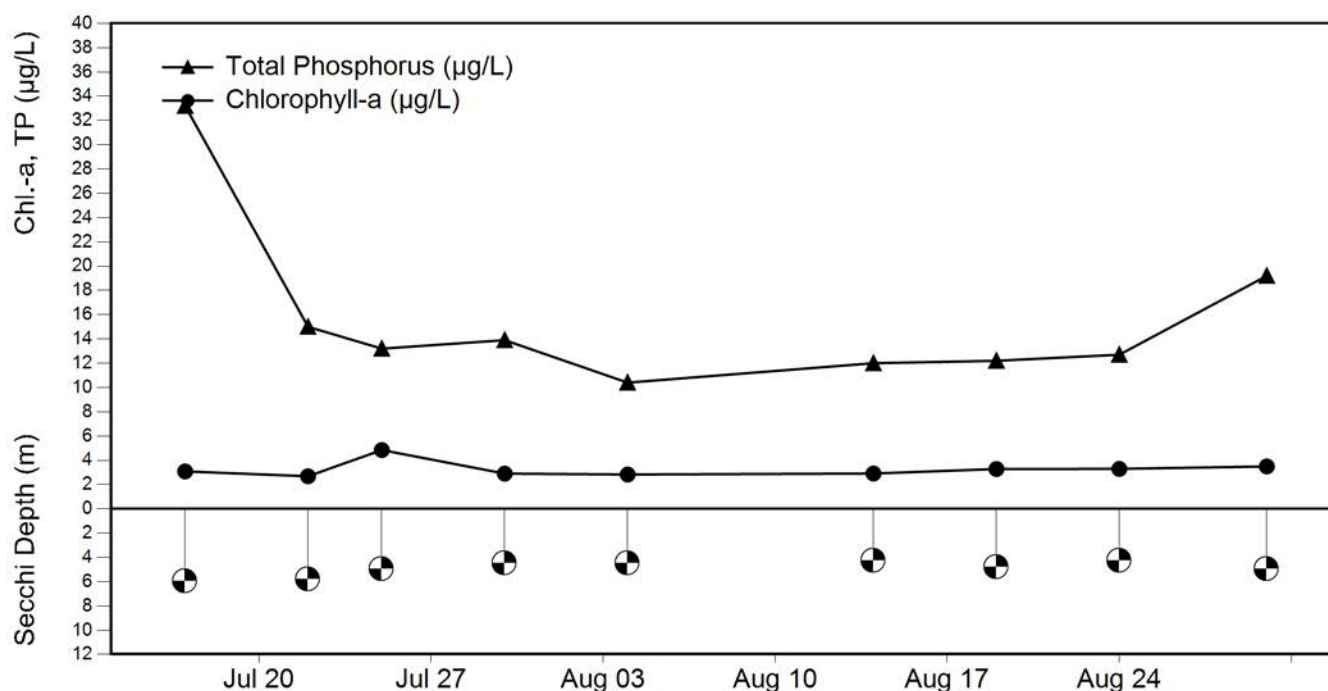
Lake Surface Area: 396 acres  
Drainage Basin Area: 18,445 acres  
Ratio (Basin:Lake): 47:1  
Maximum Depth: 78 ft (23.8 m)  
Mean Depth: 21 ft (6.4 m)

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	3.8	4.7	6.0
Chl-a ( $\mu\text{g/L}$ )	9	1.6	3.3	4.9
Summer TP ( $\mu\text{g/L}$ )	9	10.4	15.8	33.2



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# JOES POND

## Annual Data

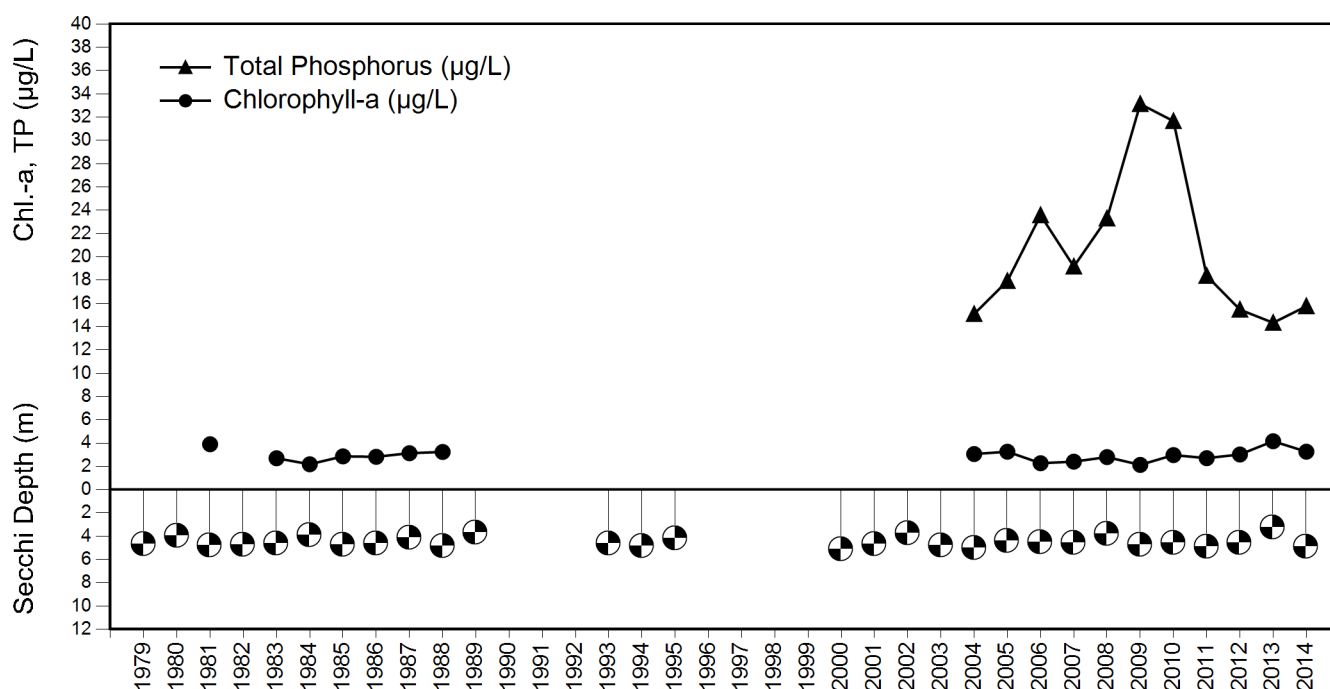
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	9	4.7			8.0
1980	4	4.0			4.0
1981	7	4.8	3.9		5.0
1982	8	4.8			7.0
1983	7	4.7	2.7		17.0
1984	12	3.9	2.2		5.0
1985	13	4.7	2.9		8.0
1986	13	4.6	2.8		7.0
1987	14	4.2	3.1		6.0
1988	13	4.9	3.2		
1989	5	3.7			
1993	11	4.7			6.7
1994	12	4.9			6.3
1995	10	4.2			
1996					7.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1998					6.0
2000	8	5.1			
2001	10	4.7			
2002	9	3.8			
2003	9	4.8			
2004	7	5.0	3.1	15.1	7.7
2005	8	4.4	3.3	17.9	11.3
2006	8	4.6	2.3	23.6	
2007	10	4.6	2.4	19.2	12.4
2008	10	3.8	2.8	23.3	9.1
2009	9	4.8	2.1	33.1	
2010	8	4.6	3.0	31.7	8.8
2011	9	4.9	2.7	18.4	
2012	10	4.6	3.0	15.5	
2013	9	3.2	4.2	14.3	9.2
2014	9	4.9	3.3	15.8	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# MAIDSTONE LAKE

Maidstone, VT

**Lay Monitors:** Lee & Mary Stewart  
Lin Mixer

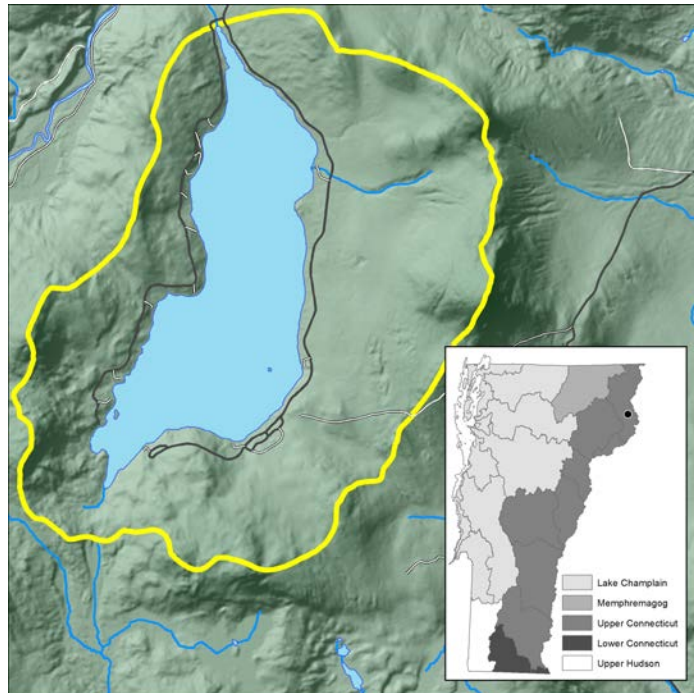
## Physical

Maidstone Lake is a large, deep, coldwater lake.

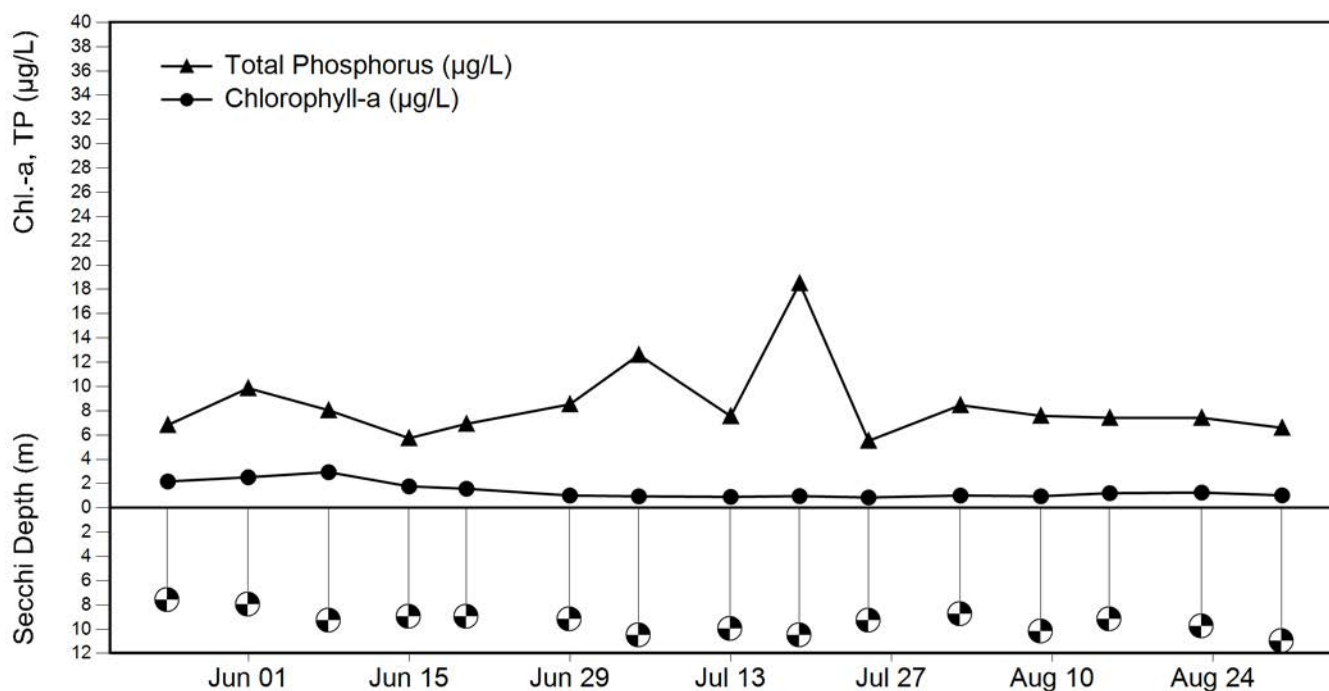
Lake Surface Area: 745 acres  
Drainage Basin Area: 3,103 acres  
Ratio (Basin:Lake): 4:1  
Maximum Depth: 121 ft (36.9 m)  
Mean Depth: 46 ft (14.0 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	15	7.2	9.4	11.0
Chl-a ( $\mu\text{g/L}$ )	15	0.8	1.4	3.1
Summer TP ( $\mu\text{g/L}$ )	15	5.5	8.5	18.5



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# MAIDSTONE LAKE

## Annual Data

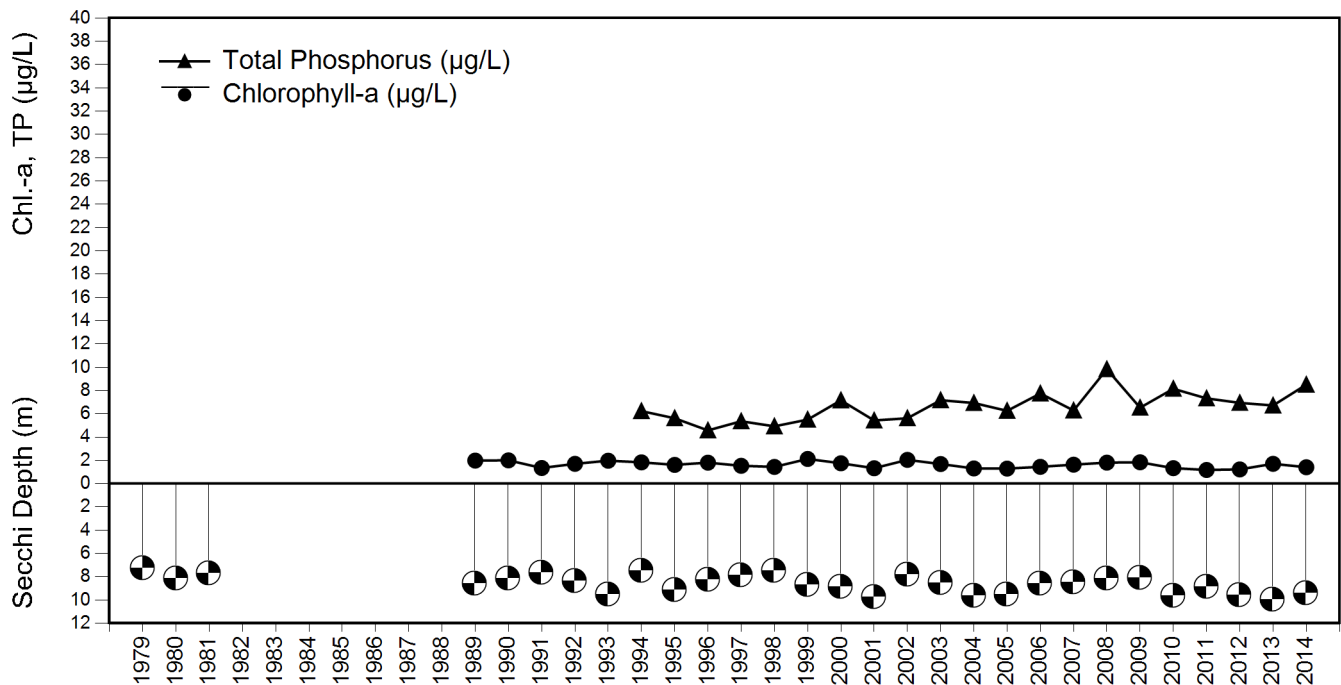
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	17	7.3			6.0
1980	14	8.2			4.0
1981	13	7.7			6.0
1989	11	8.6	2.0		
1990	14	8.2	2.0		
1991	13	7.7	1.3		
1992	13	8.4	1.7		
1993	14	9.5	2.0		
1994	13	7.5	1.8	6.2	
1995	13	9.2	1.6	5.6	
1996	14	8.3	1.8	4.6	
1987					6.0
1982					4.0
1986					6.0
1984					5.0
1983					7.0
1985					6.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	14	7.9	1.5	5.4	
1998	13	7.5	1.4	4.9	
1999	14	8.7	2.1	5.5	4.3
2000	13	8.9	1.7	7.2	
2001	14	9.8	1.3	5.4	
2002	14	7.8	2.0	5.6	
2003	12	8.5	1.7	7.2	5.3
2004	12	9.7	1.3	6.9	
2005	14	9.5	1.3	6.3	6.1
2006	13	8.6	1.4	7.7	7.6
2007	13	8.5	1.6	6.3	6.3
2008	13	8.2	1.8	9.8	6.1
2009	13	8.1	1.8	6.5	7.6
2010	14	9.6	1.3	8.2	10.0
2011	14	8.9	1.2	7.3	7.0
2012	14	9.6	1.2	6.9	
2013	15	10.0	1.7	6.7	
2014	15	9.4	1.4	8.5	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# MILES POND

Concord, VT

**Lay Monitor:** Nancy Darrah  
**Former Lay Monitors:** Bryan Panner  
 Peter Noble  
 Mary and Melvin Richardson

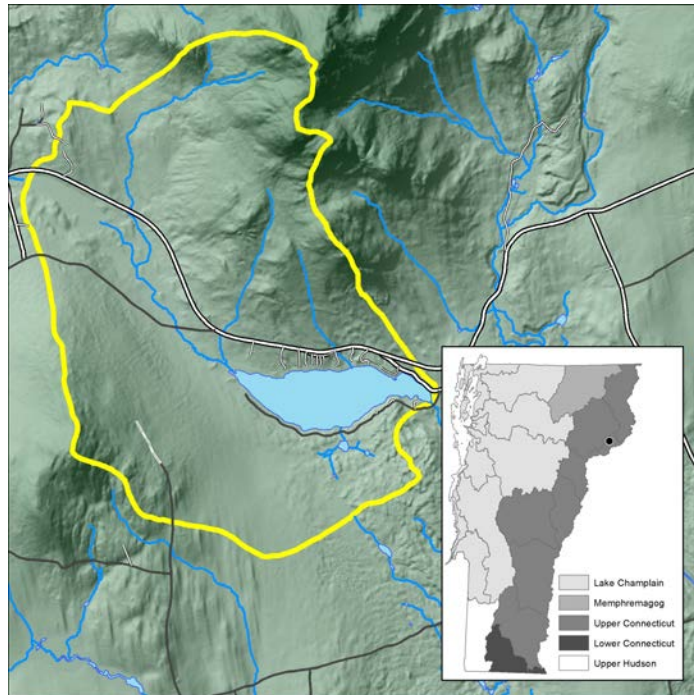
## Physical

Miles Pond is a small, relatively deep, warmwater lake.

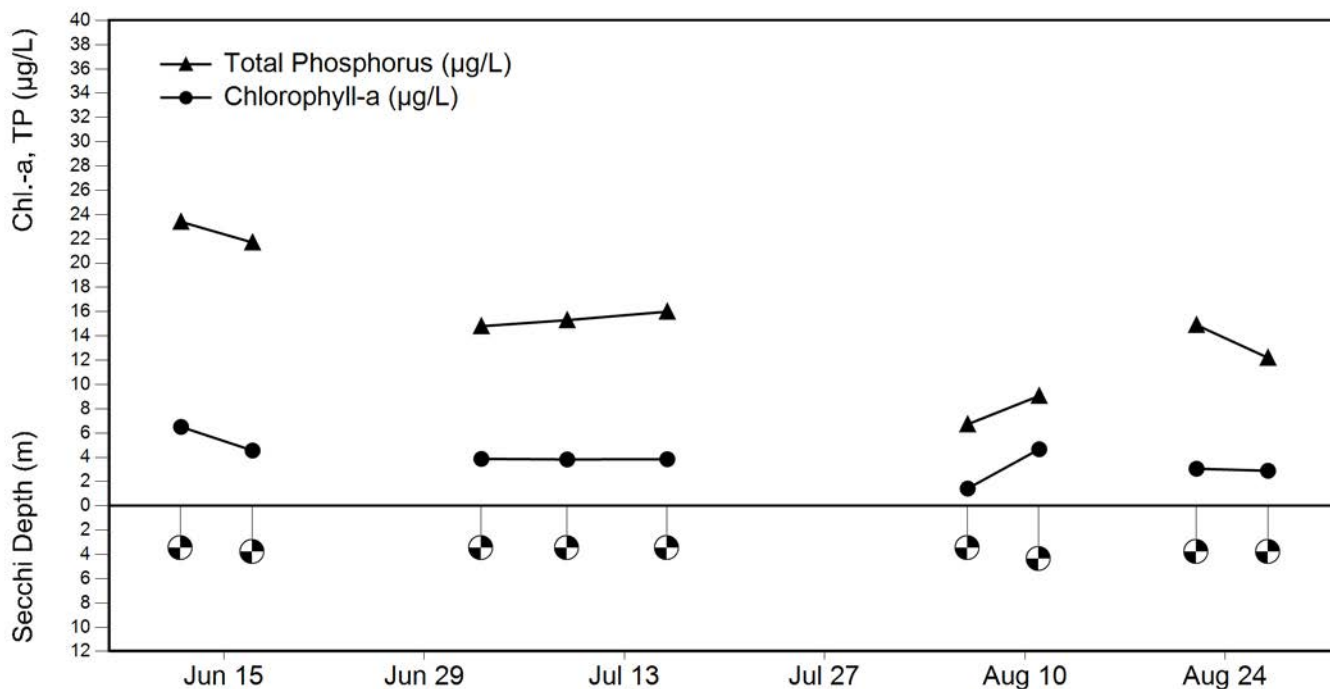
Lake Surface Area: 215 acres  
 Drainage Basin Area: 4,158 acres  
 Ratio (Basin:Lake): 19:1  
 Maximum Depth: 55 ft (16.8 m)  
 Mean Depth: 20 ft (6.1 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	3.5	3.7	4.4
Chl-a ( $\mu\text{g/L}$ )	9	1.3	3.8	7.5
Summer TP ( $\mu\text{g/L}$ )	9	6.7	14.9	23.4



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# MILES POND

## Annual Data

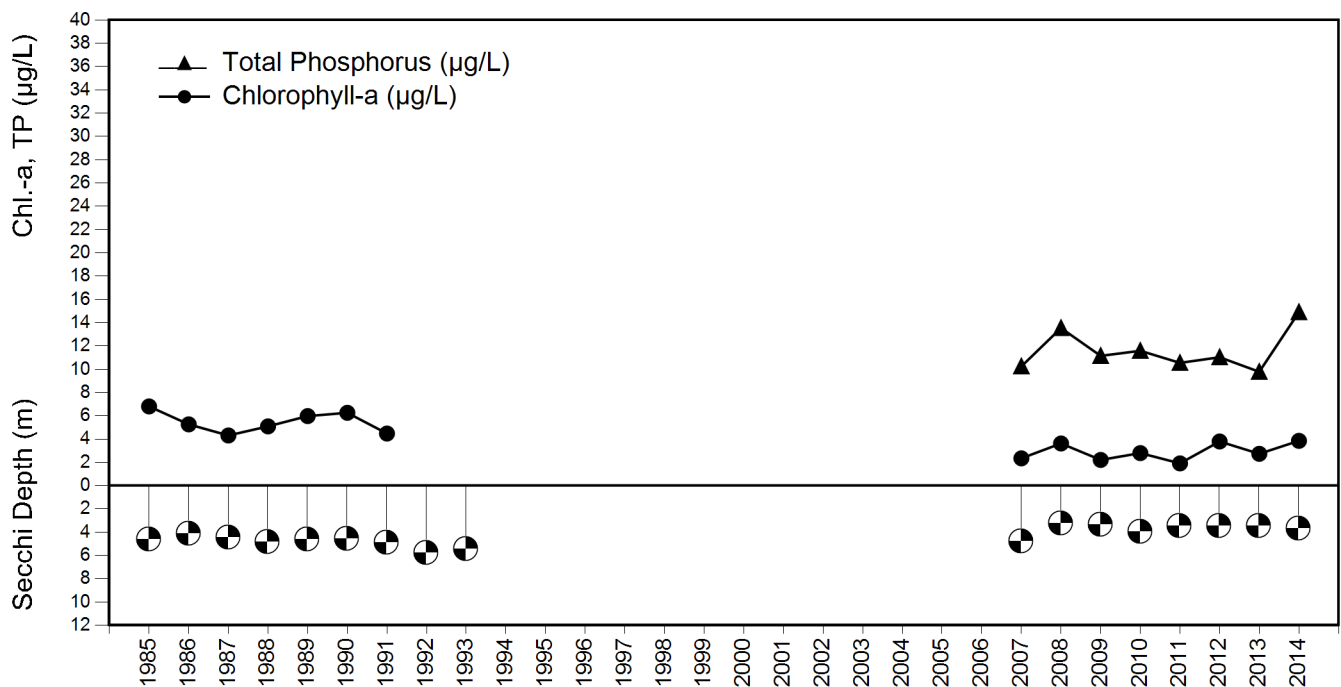
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1985	9	4.7	6.8		10.0
1986	8	4.2	5.3		12.0
1987	9	4.5	4.3		9.0
1988	9	4.8	5.1		
1989	6	4.6	6.0		
1990	7	4.6	6.3		
1991	7	4.9	4.5		
1992	7	5.8			
1993	9	5.5			
1979					3.0
1995					8.3
1983					8.0
1982					6.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
2002					9.0
2005					12.1
2007	8	4.8	2.3	10.2	9.4
2008	7	3.3	3.6	13.5	
2009	9	3.4	2.2	11.1	
2010	10	4.0	2.8	11.6	13.9
2011	9	3.5	1.9	10.5	13.9
2012	9	3.5	3.8	11.0	
2013	11	3.5	2.7	9.8	
2014	9	3.7	3.8	14.9	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# MIRROR LAKE

Calais, VT

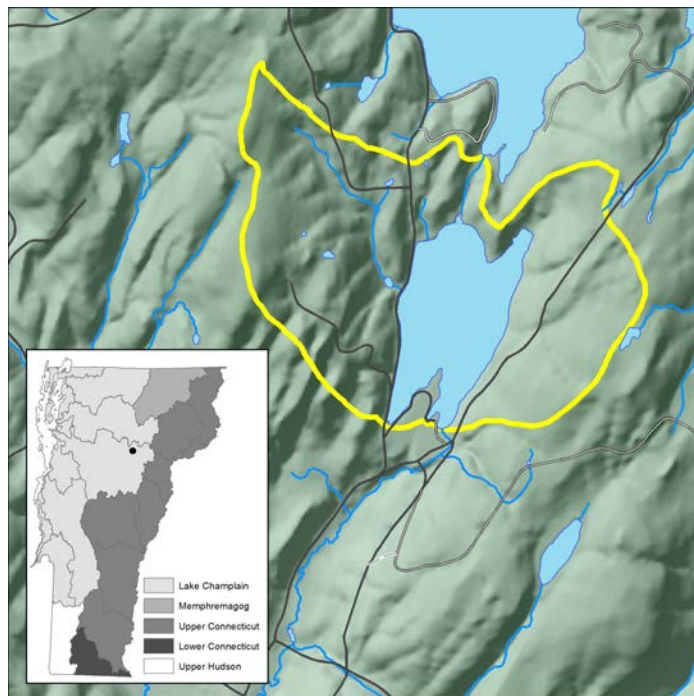
**Lay Monitor:** Ram Verma  
**Former Lay Monitors:** Rowan Jacobsen

## Physical

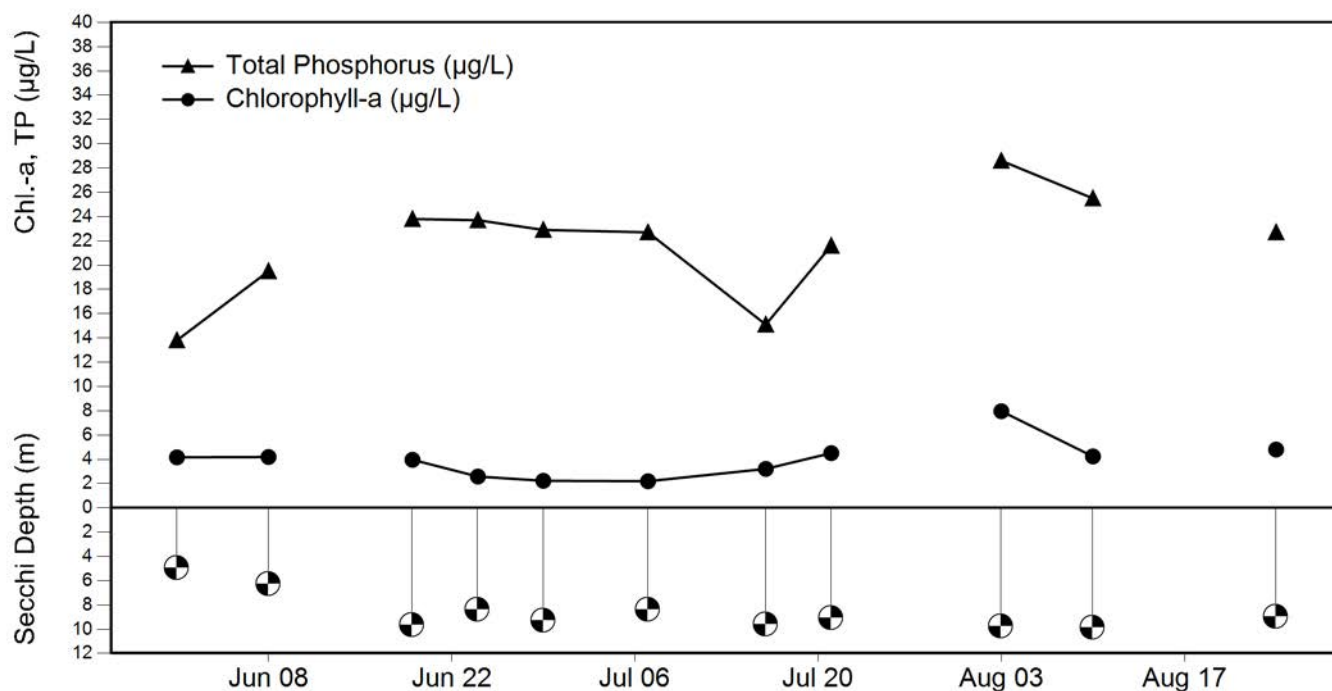
Lake Surface Area: 85 acres  
 Drainage Basin Area: 3,349 acres  
 Ratio (Basin:Lake): 39:1  
 Maximum Depth: 106 ft (32.3 m)  
 Mean Depth: 43 ft (13.1 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	12	4.4	8.6	9.9
Chl-a ( $\mu\text{g/L}$ )	11	1.1	4.0	8.7
Summer TP ( $\mu\text{g/L}$ )	11	13.8	21.8	28.6



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# MIRROR LAKE

## Annual Data

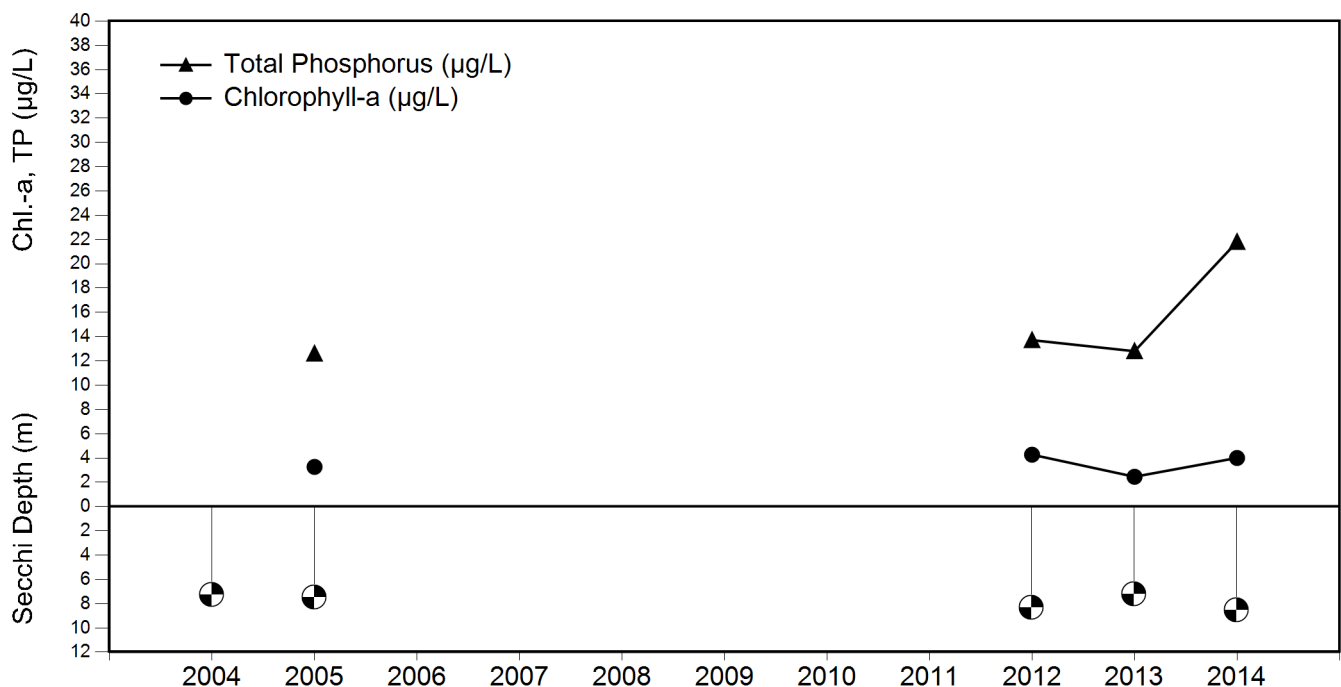
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1990					11.0
1987					14.0
1980					12.0
1982					9.0
1984					9.0
1986					16.0
1979					6.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997					11.0
2002					13.3
2004	8	7.3			10.0
2005	11	7.5	3.3	12.6	
2010					9.5
2012	8	8.4	4.3	13.7	
2013	10	7.2	2.5	12.8	
2014	11	8.6	4.0	21.8	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE MOREY

Fairlee, VT

**Lay Monitor:** Don Weaver  
**Former Lay** Bill Scott  
**Monitors:** Deb Williams  
 Patricia Pearce

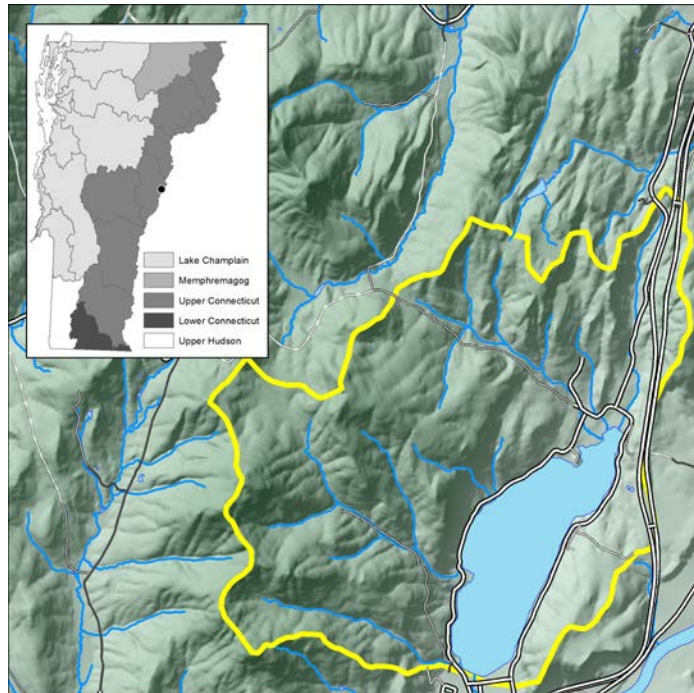
## Physical

Lake Morey is a large, relatively deep, warmwater lake.

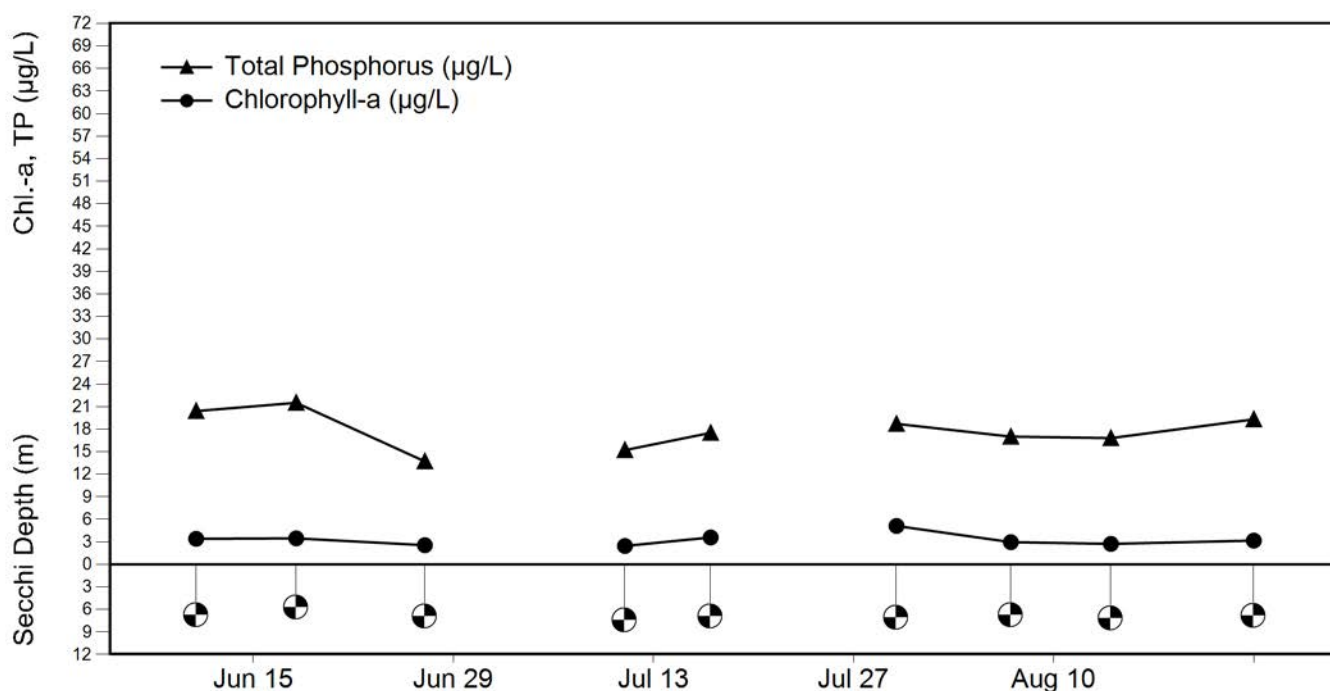
Lake Surface Area: 547 acres  
 Drainage Basin Area: 5,101 acres  
 Ratio (Basin:Lake): 9:1  
 Maximum Depth: 43 ft (13.1 m)  
 Mean Depth: 24 ft (7.3 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	5.8	7.1	8.2
Chl-a (µg/L)	9	1.9	3.3	5.2
Summer TP (µg/L)	9	13.7	17.8	21.5



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# LAKE MOREY

## Annual Data

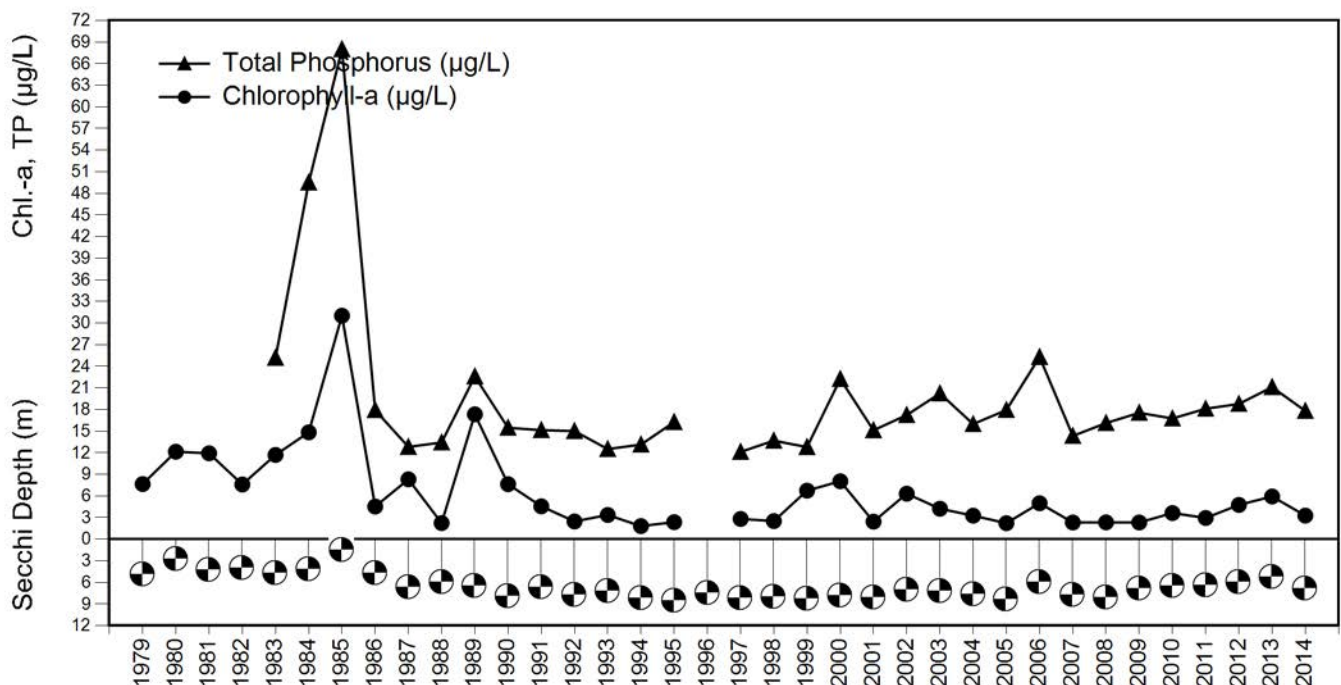
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	19	4.9	7.6		28.0
1980	14	2.8	12.1		20.0
1981	14	4.3	11.9		57.0
1982	8	4.1	7.6		54.0
1983	7	4.7	11.7	25.2	38.0
1984	9	4.2	14.8	49.5	39.0
1985	12	1.6	31.0	68.0	60.0
1986	13	4.7	4.5	17.9	41.0
1987	13	6.7	8.3	12.8	8.0
1988	12	6.0	2.2	13.4	14.0
1989	8	6.6	17.3	22.6	19.0
1990	11	7.9	7.6	15.5	18.0
1991	9	6.7	4.6	15.1	13.0
1992	7	7.8	2.5	15.0	12.0
1993	10	7.2	3.4	12.5	13.3
1994	8	8.2	1.8	13.1	
1995	8	8.6	2.4	16.3	11.0
1996	8	7.5			10.3

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	9	8.2	2.8	12.1	12.7
1998	9	8.0	2.5	13.7	10.7
1999	9	8.3	6.7	12.8	
2000	9	7.9	8.0	22.2	
2001	9	8.1	2.4	15.1	
2002	9	7.1	6.3	17.2	12.0
2003	9	7.2	4.2	20.2	15.0
2004	9	7.7	3.3	16.0	14.0
2005	9	8.4	2.2	17.9	11.5
2006	9	6.0	5.0	25.3	
2007	9	7.8	2.3	14.3	14.4
2008	9	8.1	2.3	16.1	13.2
2009	9	6.9	2.3	17.5	18.4
2010	9	6.5	3.6	16.7	15.1
2011	9	6.4	2.9	18.1	
2012	9	6.0	4.8	18.8	
2013	9	5.3	5.9	21.1	15.5
2014	9	6.9	3.3	17.8	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# NEWARK POND

Newark, VT

**Lay Monitor:** Libby & Don Welch

**Former Lay** John Warren

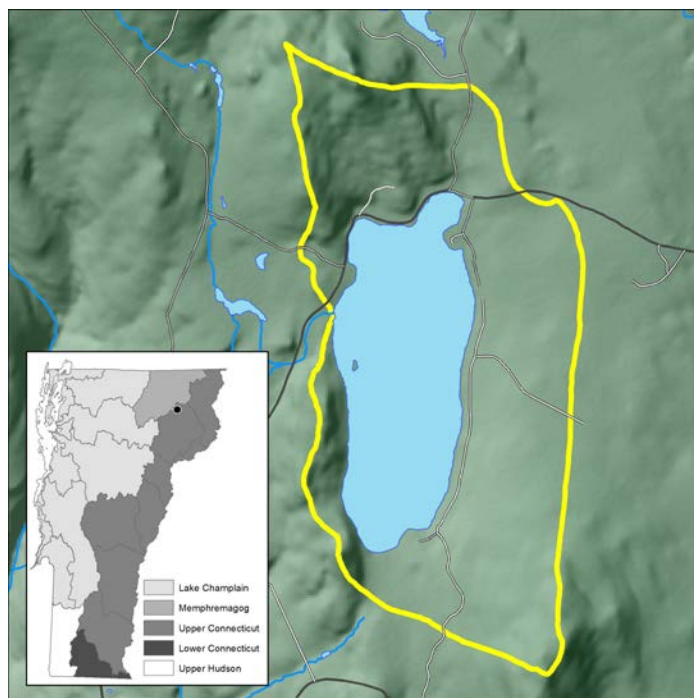
**Monitors:**

## Physical

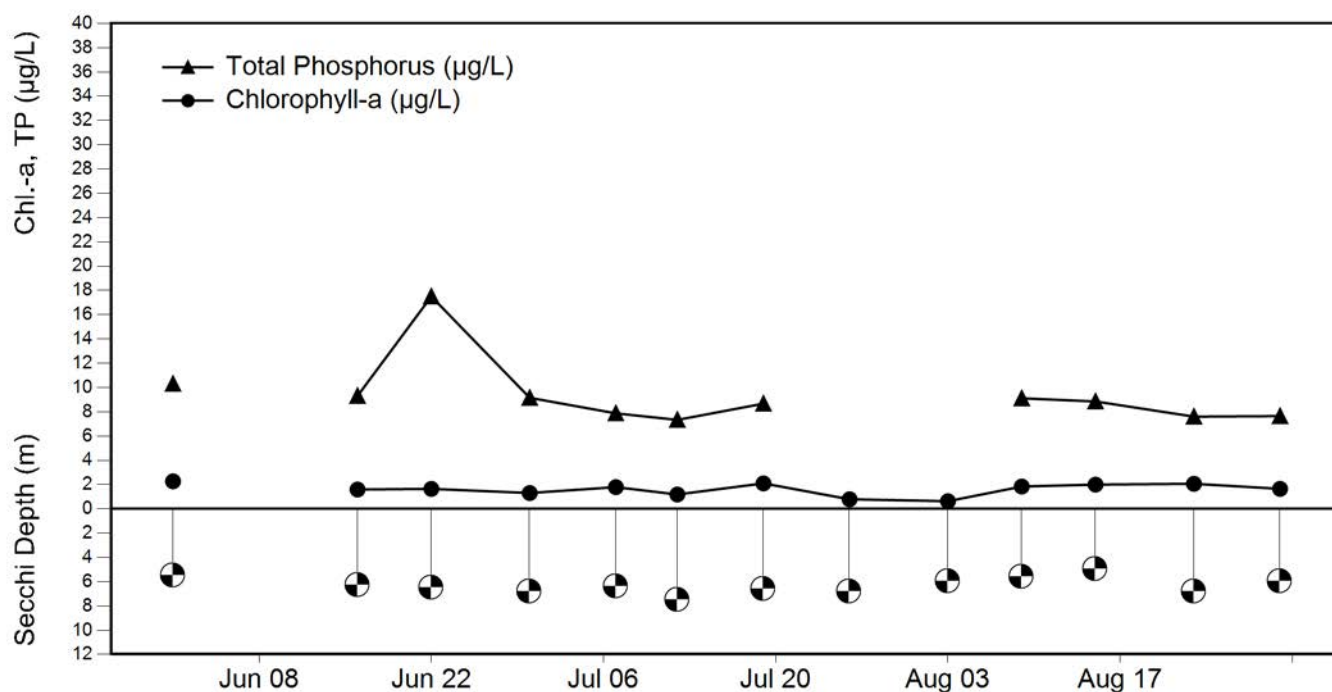
Lake Surface Area: 153 acres  
 Drainage Basin Area: 554 acres  
 Ratio (Basin/Lake): 4:1  
 Maximum Depth: 31 ft (9.4 m)  
 Mean Depth: 14 ft (4.3 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	13	5.0	6.0	7.5
Chl-a ( $\mu\text{g/L}$ )	13	0.6	1.6	2.4
Summer TP ( $\mu\text{g/L}$ )	11	7.3	9.4	17.5



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



## NEWARK POND

### Annual Data

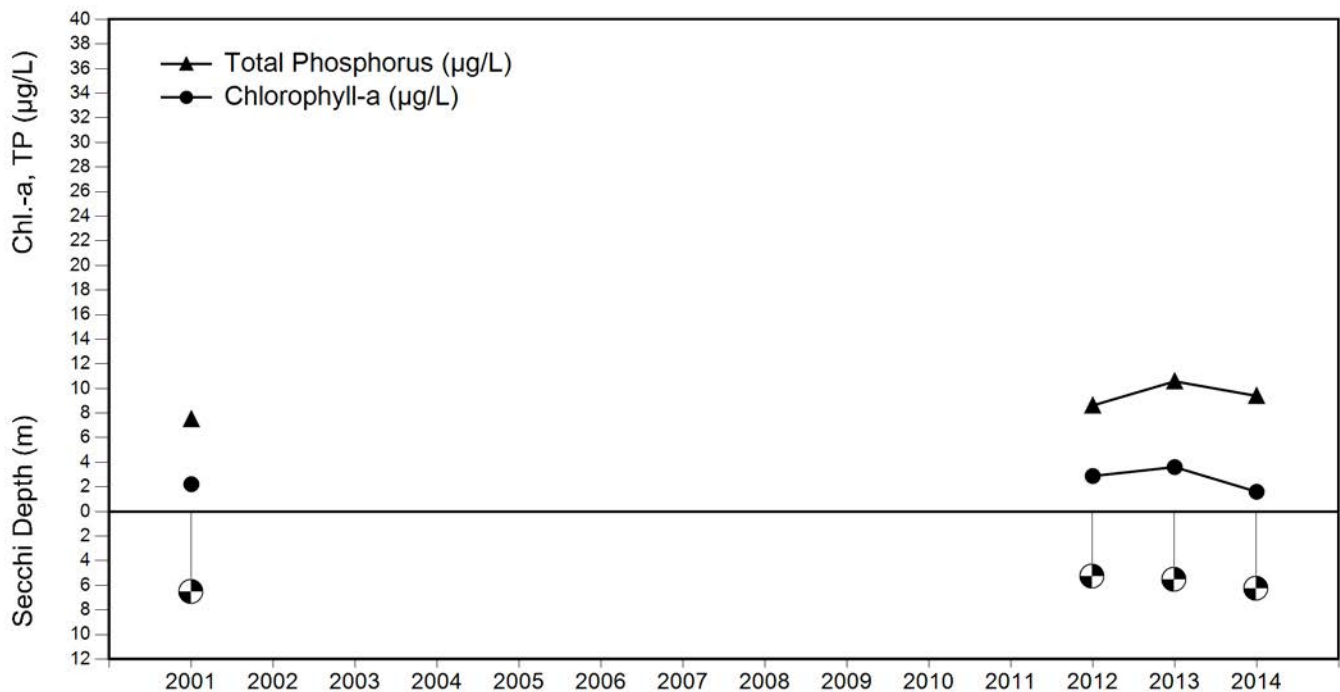
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1995					7.0
1988					6.0
1979					7.0
1984					11.0
1980					6.0

### Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
2001	13	6.6	2.2	7.5	5.3
2005					7.9
2006					8.8
2007					8.9
2010					8.4
2012	12	5.3	2.9	8.6	
2013	10	5.6	3.6	10.6	
2014	13	6.3	1.6	9.4	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

### Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# NICHOLS POND

Woodbury, VT

**Lay Monitor:** Michael Gray & Ellie Hayes  
**Former Lay Monitors:** Doug Stitely

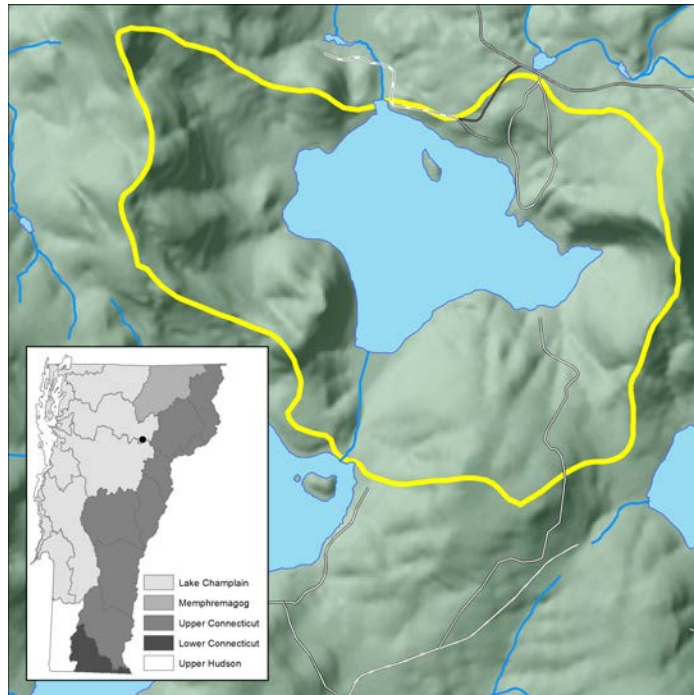
## Physical

Nichols Pond is a moderately sized, deep, coldwater lake.

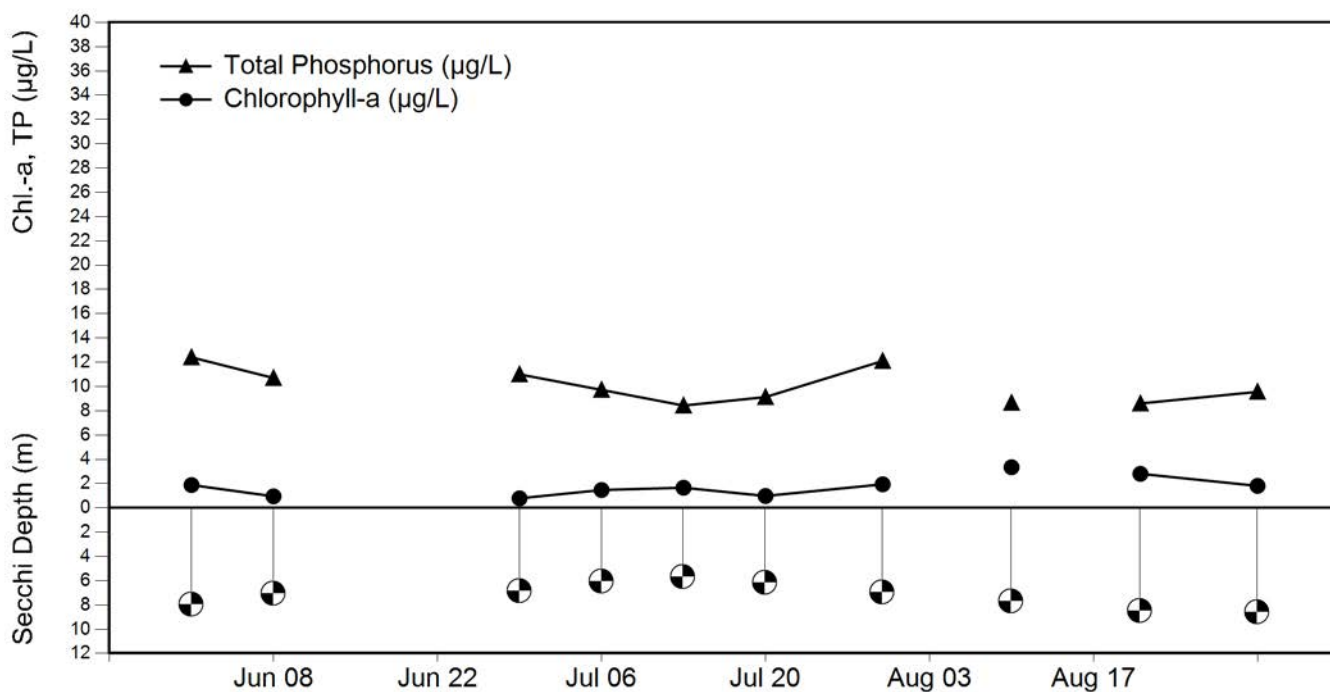
Lake Surface Area: 171 acres  
 Drainage Basin Area: 2,920 acres  
 Ratio (Basin:Lake): 17:1  
 Maximum Depth: 109 ft (33.2 m)  
 Mean Depth: ft (0.0 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	10	5.7	7.2	9.1
Chl-a ( $\mu\text{g/L}$ )	10	0.6	1.8	3.8
Summer TP ( $\mu\text{g/L}$ )	10	8.4	10.0	12.4



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# NICHOLS POND

## Annual Data

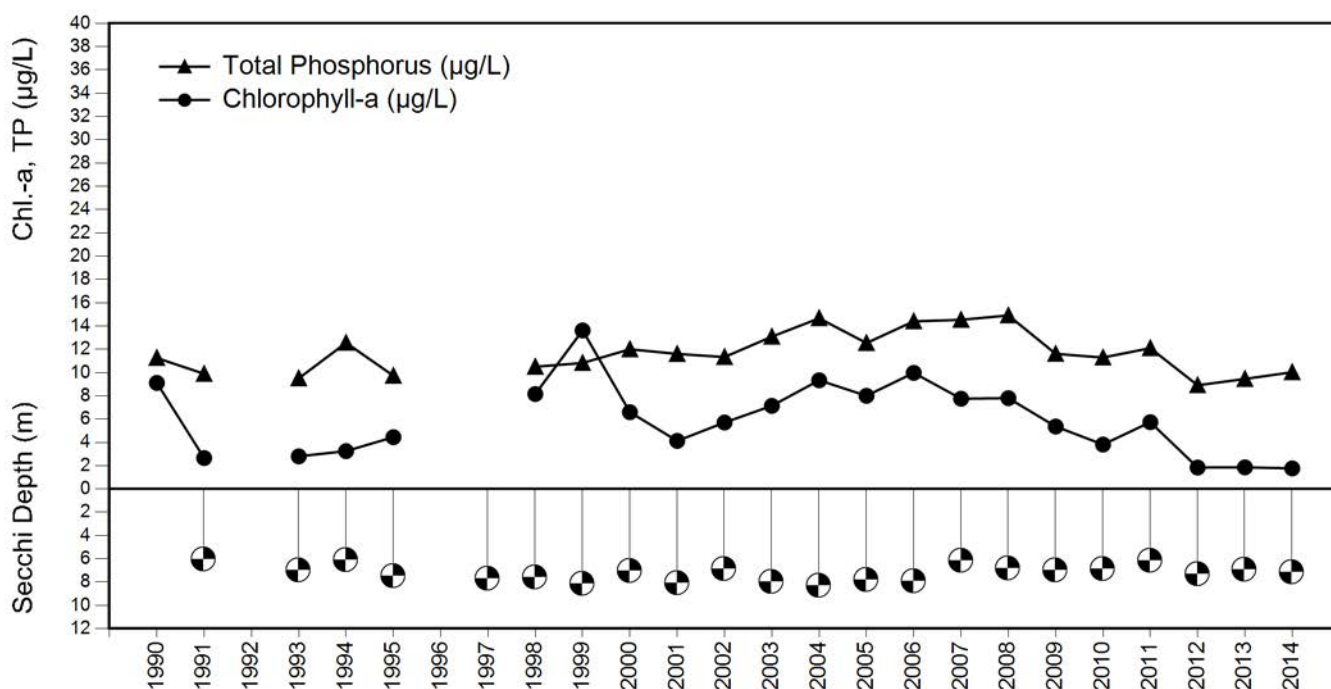
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1990	12		9.1	11.3	9.0
1991	9	6.1	2.7	9.9	7.0
1993	8	7.0	2.8	9.5	
1994	9	6.1	3.3	12.6	
1995	11	7.5	4.4	9.7	
1989					7.0
1979					6.0
1988					9.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	12	7.8			7.3
1998	10	7.6	8.2	10.5	11.3
1999	11	8.2	13.6	10.8	
2000	11	7.1	6.6	12.0	
2001	10	8.1	4.1	11.6	
2002	12	6.9	5.7	11.3	
2003	12	8.0	7.1	13.1	
2004	12	8.3	9.3	14.7	10.0
2005	8	7.9	8.0	12.5	
2006	10	8.0	10.0	14.4	
2007	10	6.2	7.8	14.5	13.7
2008	11	6.9	7.8	14.9	
2009	11	7.0	5.4	11.6	
2010	12	6.9	3.8	11.3	11.0
2011	11	6.2	5.7	12.1	
2012	11	7.4	1.8	8.9	9.1
2013	10	6.9	1.9	9.5	
2014	10	7.2	1.8	10.0	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# NORTH MONTPELIER POND

## East Montpelier, VT

**Lay Monitor:** Laura Brown  
**Former Lay Monitors:** George Springston  
Rose Paul  
Trey Willey

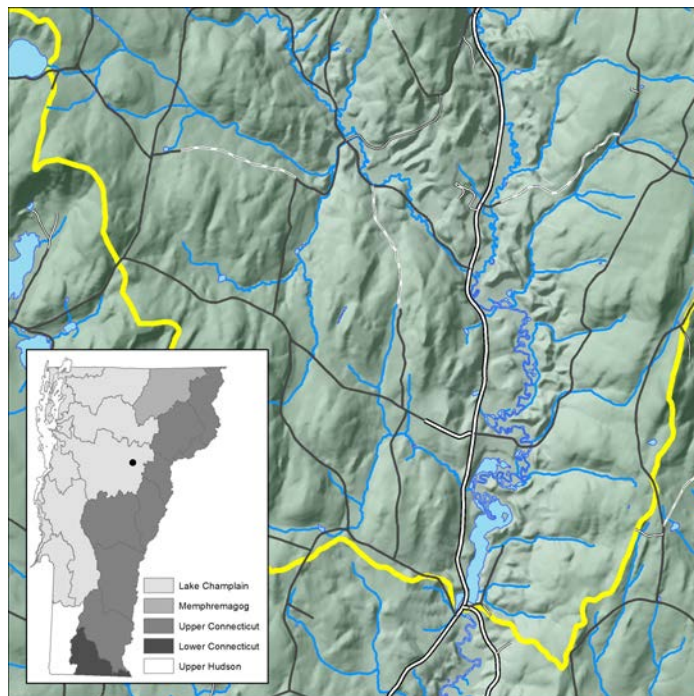
### Physical

North Montpelier Pond is a small, warmwater lake.

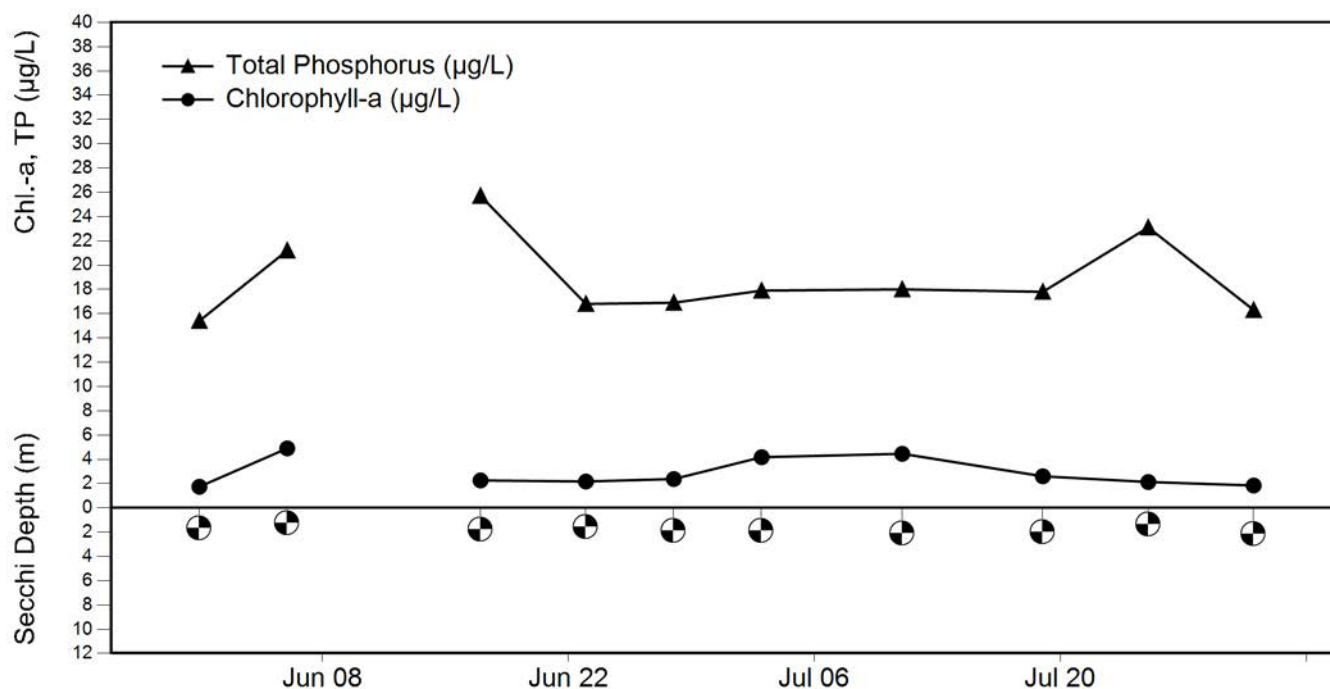
Lake Surface Area: 72 acres  
Drainage Basin Area: 32,581 acres  
Ratio (Basin:Lake): 453:1  
Maximum Depth: 12 ft (3.7 m)

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	10	1.3	1.8	2.2
Chl-a ( $\mu\text{g/L}$ )	10	1.7	2.9	4.9
Summer TP ( $\mu\text{g/L}$ )	10	15.4	18.9	25.7



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# NORTH MONTPELIER POND

## Annual Data

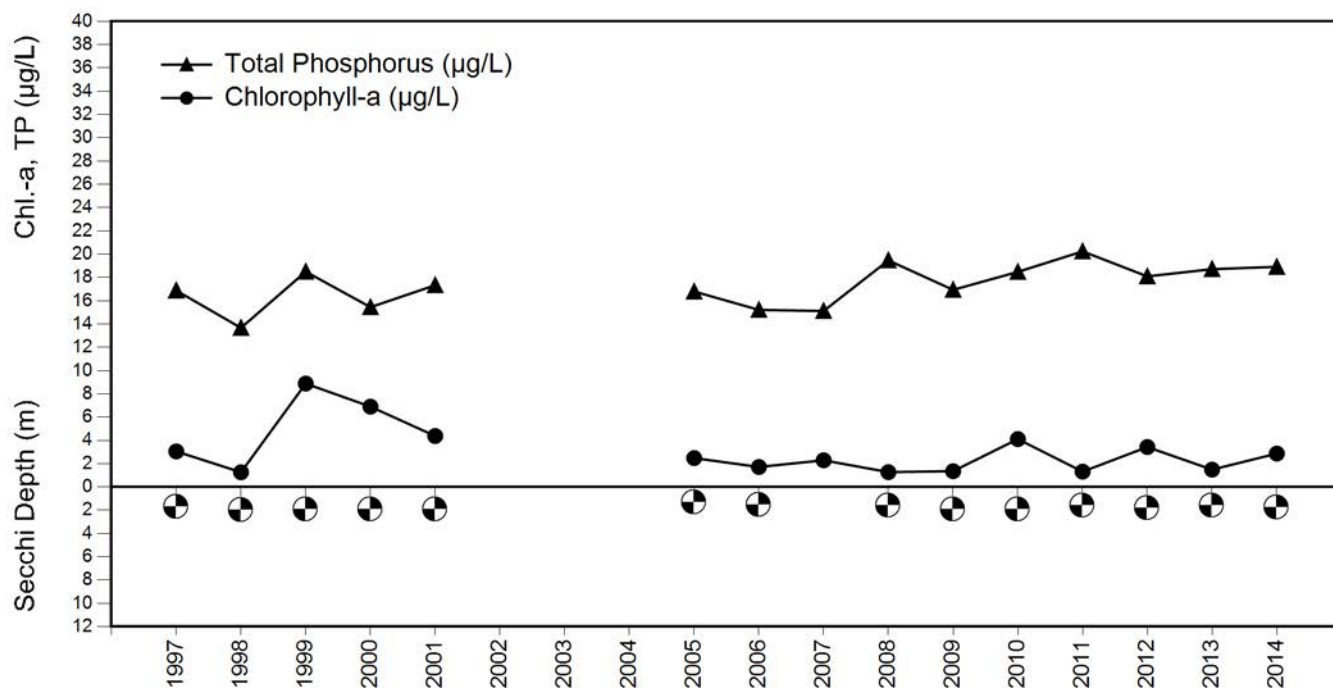
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979					7.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	8	1.7	3.1	16.9	
1998	9	2.0	1.3	13.7	
1999	10	2.0	8.9	18.5	
2000	9	2.0	6.9	15.4	
2001	10	2.0	4.4	17.3	
2002					15.7
2003					11.7
2004					12.7
2005	10	1.3	2.5	16.8	
2006	9	1.6	1.7	15.2	
2007	9	*B	2.3	15.1	
2008	9	1.6	1.3	19.5	
2009	9	2.0	1.4	16.9	
2010	9	1.9	4.1	18.5	18.2
2011	10	1.6	1.3	20.2	
2012	9	1.9	3.4	18.1	
2013	9	1.6	1.5	18.7	
2014	10	1.8	2.9	18.9	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE PARKER

Glover, VT

**Lay Monitor:** Robert Richards  
**Former Lay Monitors:** Bob Johnson  
 Linda Benoit  
 Arnold & Marjorie Smith

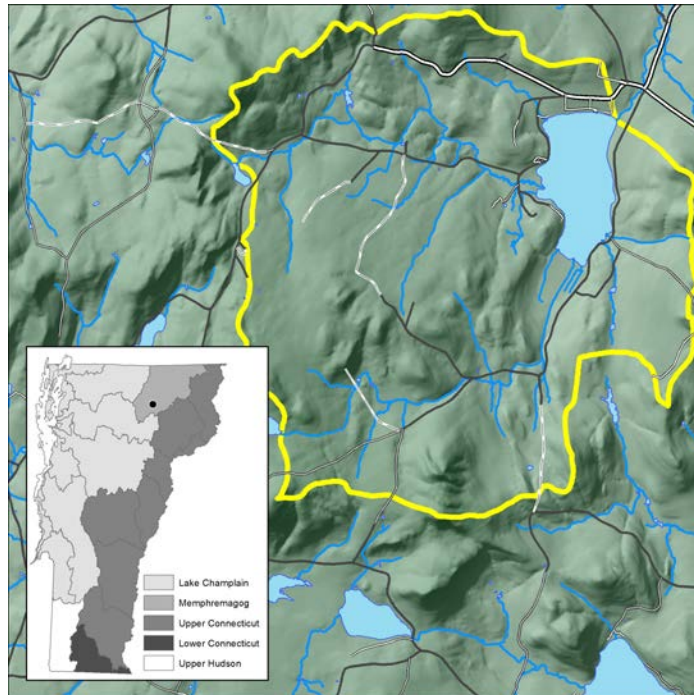
## Physical

Lake Parker is a relatively large, fairly shallow, warmwater lake.

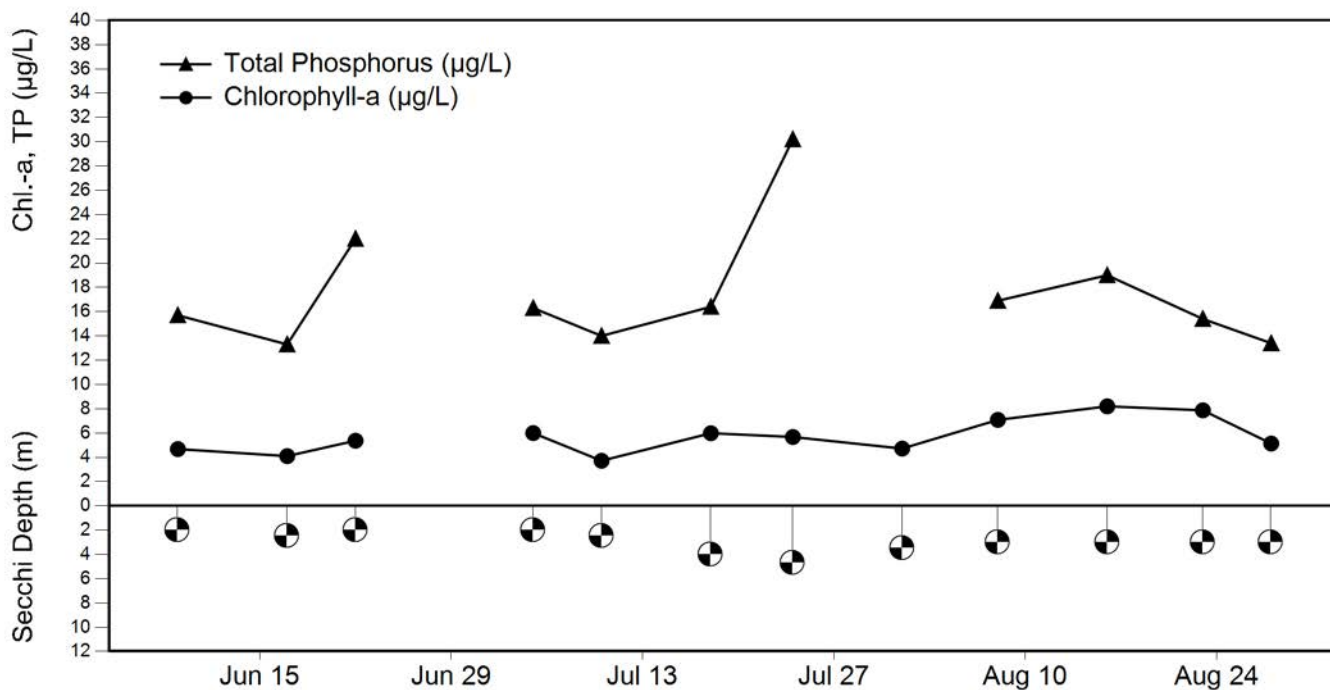
Lake Surface Area: 250 acres  
 Drainage Basin Area: 5,418 acres  
 Ratio (Basin:Lake): 22:1  
 Maximum Depth: 45 ft (13.7 m)  
 Mean Depth: 25 ft (7.6 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	12	2.0	2.9	4.9
Chl-a ( $\mu\text{g/L}$ )	12	3.7	5.7	8.2
Summer TP ( $\mu\text{g/L}$ )	11	13.3	17.5	30.2



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE PARKER

## Annual Data

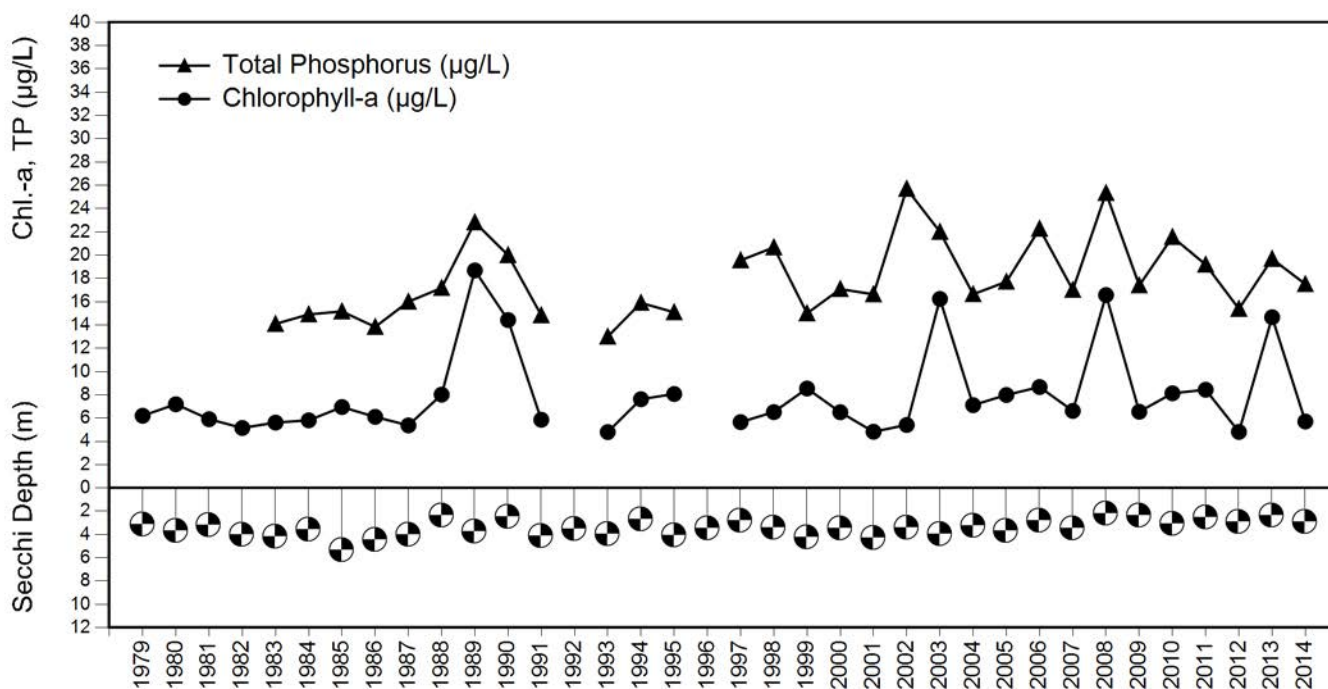
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	23	3.2	6.2		
1980	13	3.7	7.2		17.0
1981	13	3.2	5.9		22.0
1982	13	4.0	5.2		18.0
1983	13	4.2	5.6	14.1	14.0
1984	13	3.6	5.8	14.9	13.0
1985	12	5.3	6.9	15.2	14.0
1986	12	4.5	6.1	13.8	13.0
1987	12	4.0	5.4	16.0	12.0
1988	12	2.4	8.0	17.2	
1989	12	3.8	18.7	22.8	
1990	12	2.5	14.4	20.0	19.0
1991	12	4.2	5.9	14.8	15.0
1992	13	3.6			
1993	12	4.0	4.8	13.0	
1994	10	2.7	7.6	15.9	
1995	11	4.1	8.1	15.1	21.0
1996	9	3.5			

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	9	2.8	5.7	19.6	14.0
1998	9	3.4	6.5	20.7	
1999	11	4.3	8.5	15.0	16.7
2000	12	3.5	6.5	17.1	19.3
2001	11	4.3	4.8	16.6	12.3
2002	10	3.4	5.4	25.7	17.0
2003	12	4.0	16.2	22.0	
2004	13	3.3	7.1	16.6	14.3
2005	11	3.7	8.0	17.7	15.1
2006	12	2.8	8.7	22.3	17.3
2007	12	3.5	6.6	17.0	22.5
2008	14	2.2	16.6	25.3	
2009	15	2.4	6.5	17.4	18.6
2010	14	3.1	8.1	21.6	
2011	14	2.5	8.4	19.2	
2012	12	2.9	4.8	15.4	
2013	9	2.4	14.7	19.7	
2014	12	2.9	5.7	17.5	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# PEACHAM POND

Peacham, VT

**Lay Monitors:** Martha & John Winston

**Former Lay Monitors:** Vic & Lu LaPrade

Dennis Hendy  
Stanley Flink

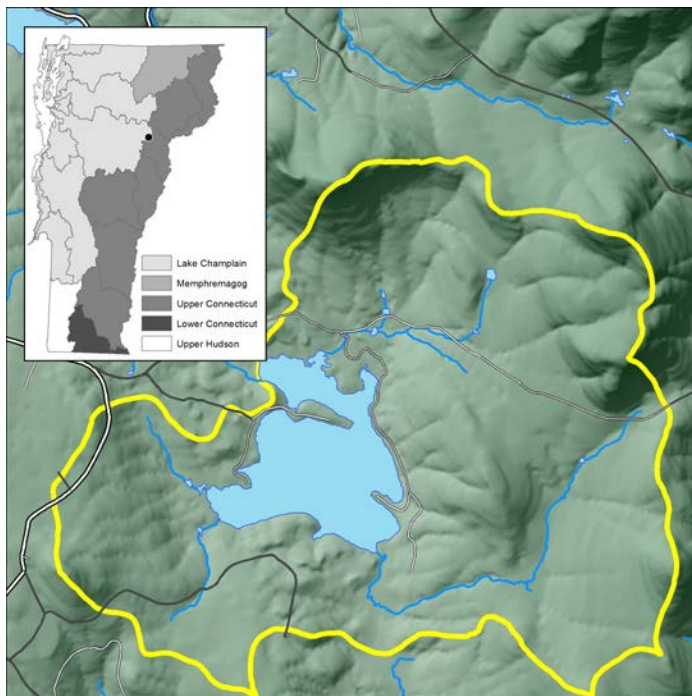
## Physical

Peacham pond is a relatively large, deep lake.

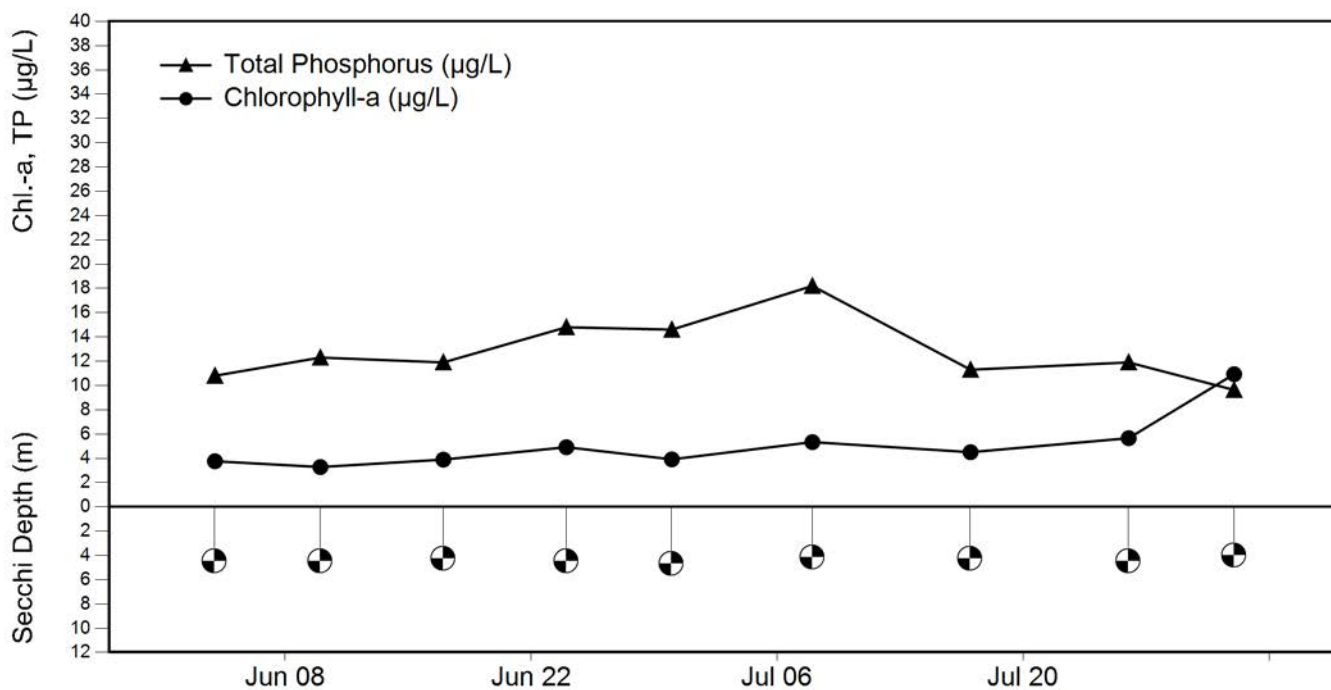
Lake Surface Area: 340 acres  
Drainage Basin Area: 3,750 acres  
Ratio (Basin:Lake): 11:1  
Maximum Depth: 61 ft (18.6 m)  
Mean Depth: 20 ft (6.1 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	2.1	3.2	4.7
Chl-a ( $\mu\text{g/L}$ )	9	2.9	5.1	13.0
Summer TP ( $\mu\text{g/L}$ )	9	9.6	12.8	18.2



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# PEACHAM POND

## Annual Data

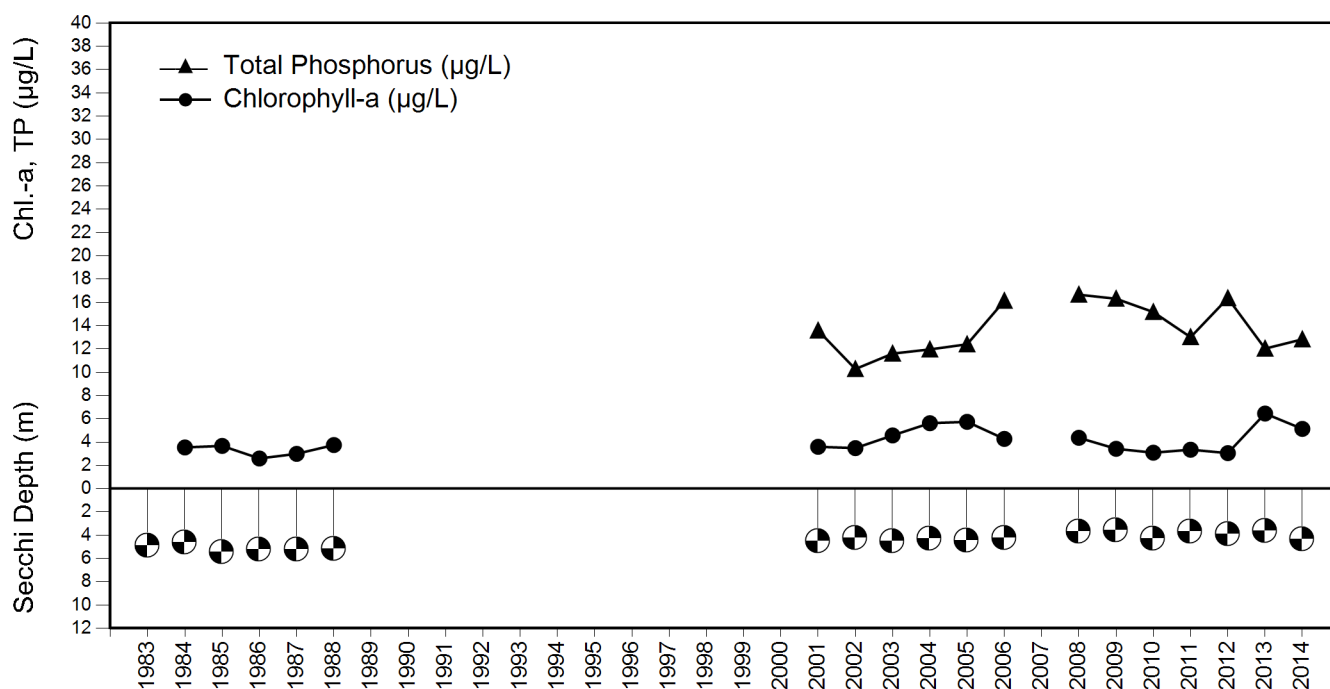
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1983	10	4.9			12.0
1984	13	4.7	3.5		7.0
1985	11	5.5	3.7		8.0
1986	9	5.2	2.6		
1987	12	5.3	3.0		
1988	10	5.2	3.7		
1979					5.0
1994					7.3

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1998					8.3
2001	12	4.5	3.6	13.6	
2002	11	4.3	3.5	10.3	8.3
2003	10	4.6	4.6	11.6	
2004	10	4.3	5.6	12.0	
2005	10	4.5	5.7	12.4	
2006	10	4.3	4.3	16.1	
2008	8	3.7	4.4	16.7	10.4
2009	10	3.6	3.4	16.3	
2010	10	4.3	3.1	15.2	
2011	9	3.7	3.3	13.0	
2012	10	3.9	3.1	16.4	
2013	9	3.6	6.5	12.0	
2014	9	4.4	5.1	12.8	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# PERCH POND

Benson, VT

**Lay Monitor:** Dwight Fowler  
**Former Lay Monitors:** John Molnar  
 Harriet & Gordon Mitchell  
 Ginny Shaw

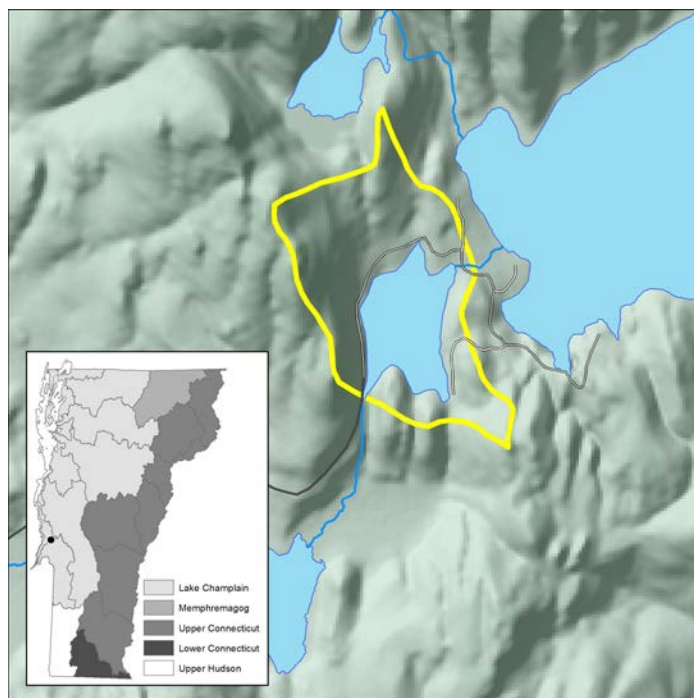
## Physical

Perch Pond is a small relatively deep warmwater lake.

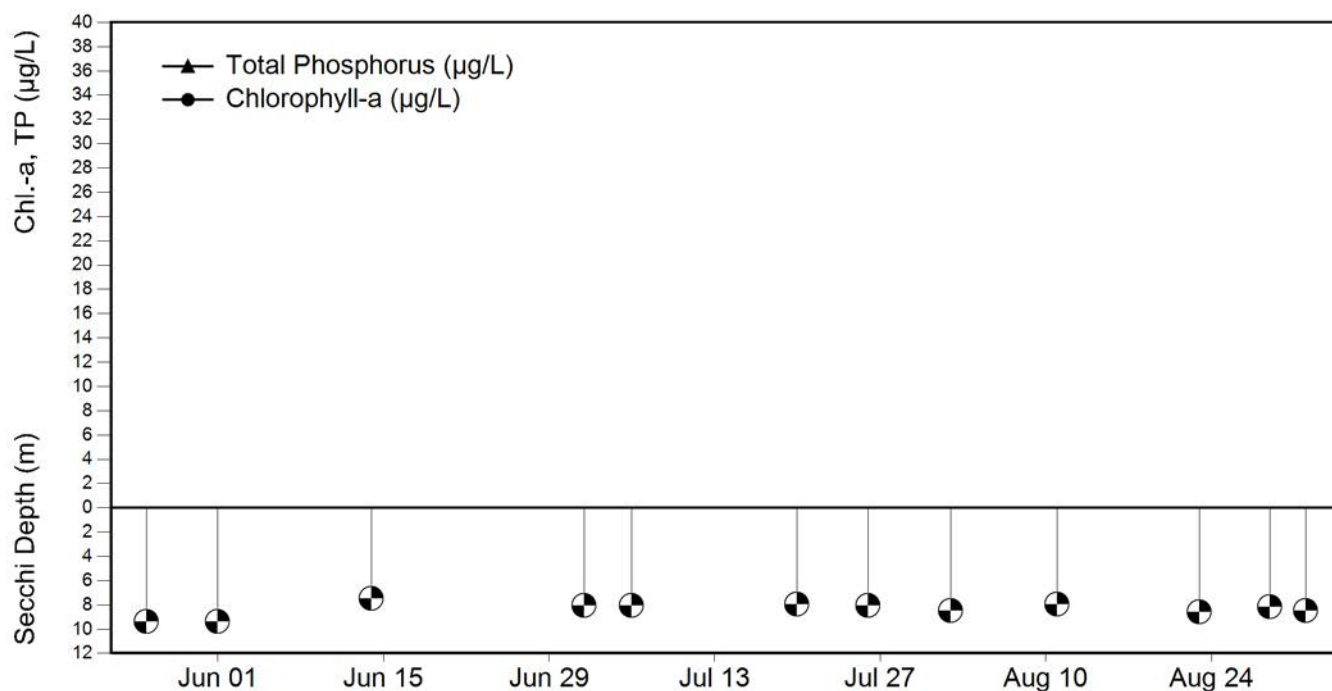
Lake Surface Area: 24 acres  
 Drainage Basin Area: 110 acres  
 Ratio (Basin:Lake): 4.6  
 Maximum Depth: 44 ft (13.4 m)  
 Mean Depth: 16 ft (4.9 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	12	7.5	8.3	9.6



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



## PERCH POND

### Annual Data

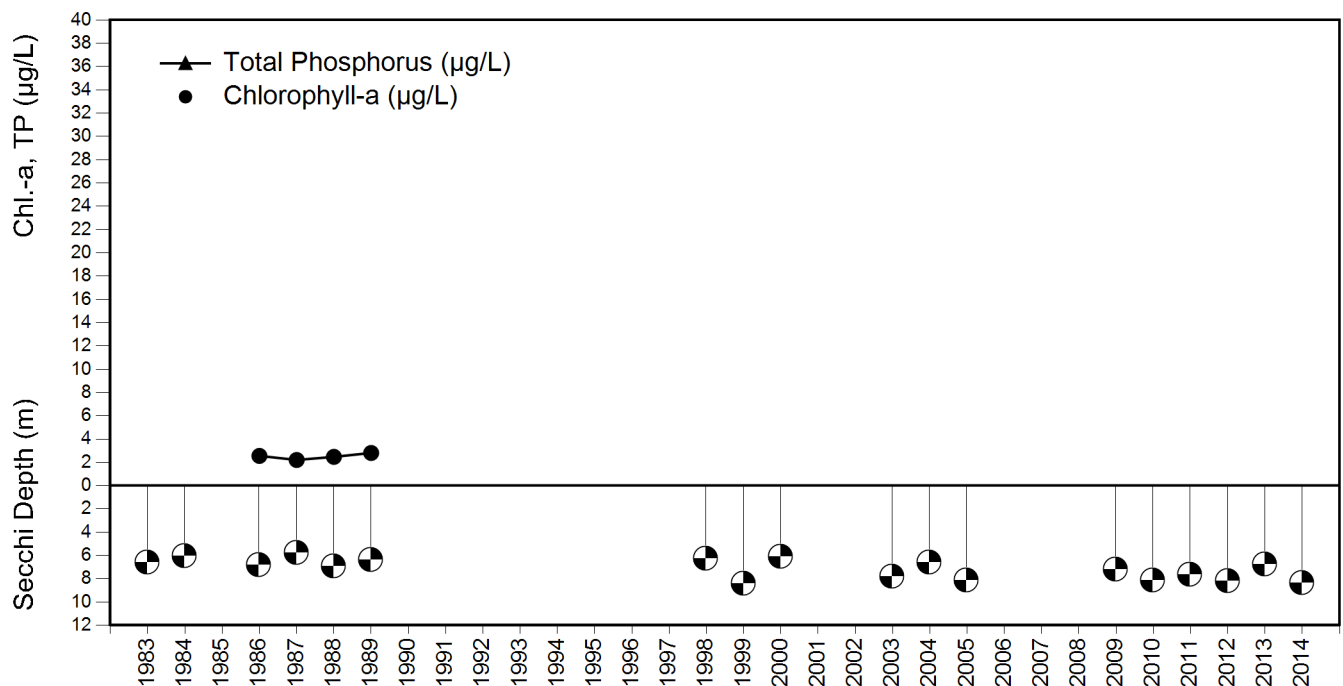
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1983	12	6.6			8.0
1984	6	6.1			11.0
1986	14	6.8	2.6		9.0
1987	13	5.8	2.2		
1988	13	7.0	2.5		
1989	12	6.4	2.8		
1993					9.7
1985					10.0

### Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997					7.3
1998	8	6.3			
1999	9	8.5			
2000	8	6.1			
2002					9.3
2003	9	7.8			12.7
2004	10	6.6			
2005	11	8.1			11.9
2009	9	7.3			
2010	10	8.2			
2011	10	7.7			8.7
2012	9	8.2			
2013	9	6.8			
2014	12	8.4			

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

### Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# RAPONDA

## Wilmington, VT

**Lay Monitor:** Cindy Meyer  
**Former Lay Monitors:** Steven Loewy

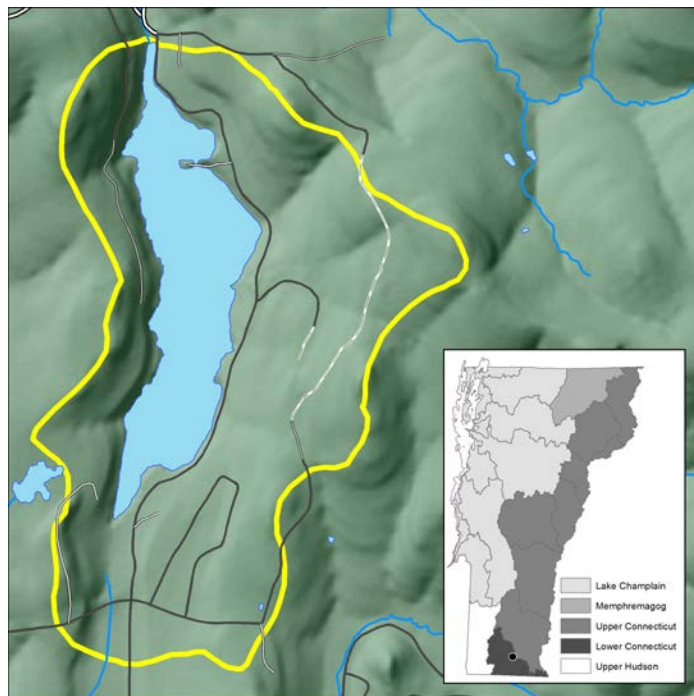
### Physical

Raponda is a moderately sized, warmwater lake.

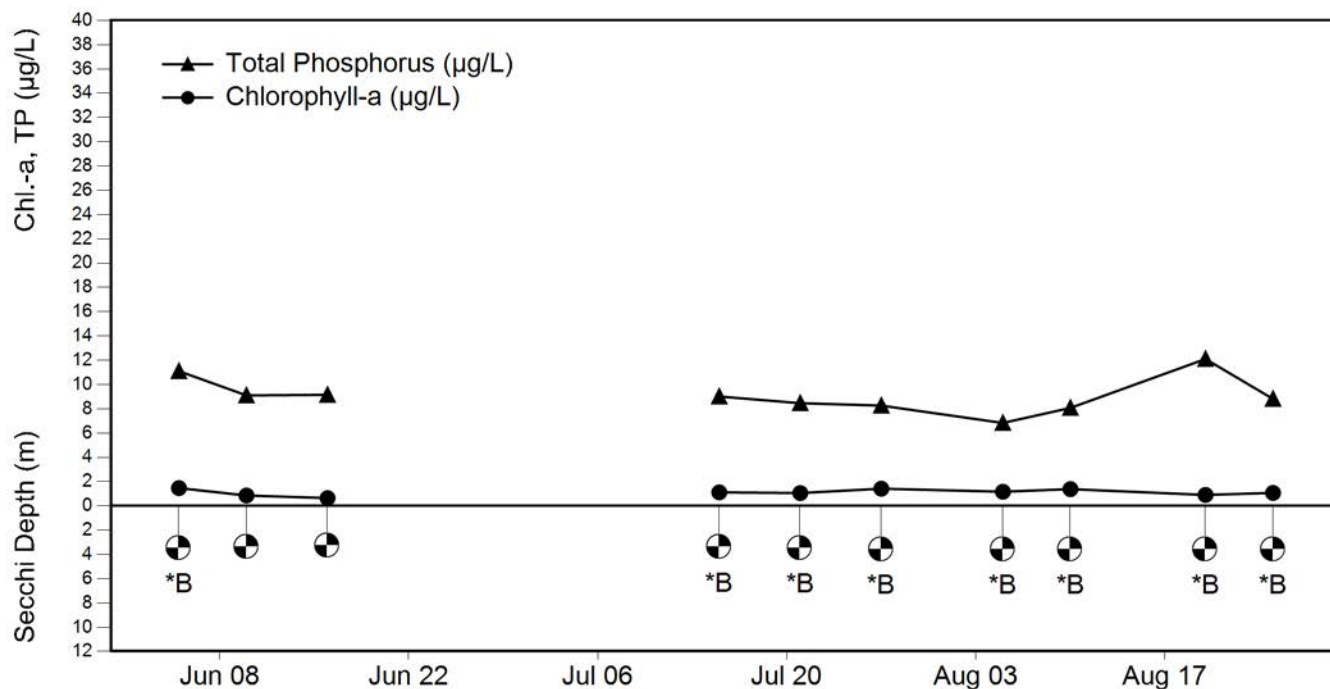
Lake Surface Area: 121 acres  
 Drainage Basin Area: 616 acres  
 Ratio (Basin:Lake): 5:1  
 Maximum Depth: 12ft (3.7 m)  
 Mean Depth: 8 ft (2.4 m)

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m) *B	10	3.3	3.5	3.6
Chl-a (µg/L)	10	0.6	1.1	1.9
Summer TP (µg/L)	10	6.8	9.1	12.1



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# RAPONDA

## Annual Data

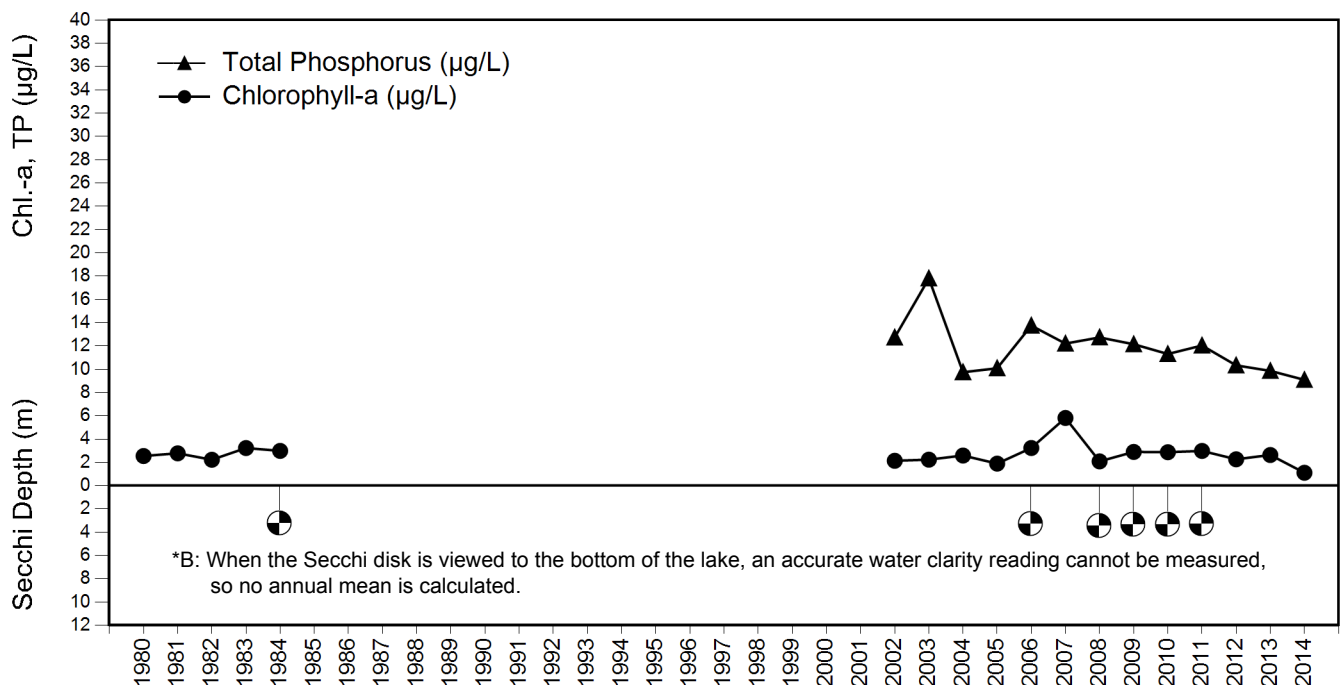
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1980	13	*B	2.5		15.0
1981	13	*B	2.8		10.0
1982	12	*B	2.2		5.0
1983	10	*B	3.2		8.0
1984	11	3.3	3.0		9.0
1991	12	*B			
1994					6.7
1985					12.0
1987					19.0
1986					12.0
1979					8.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1999					10.7
2002	11	*B	2.1	12.7	
2003	10	*B	2.2	17.8	
2004	10	*B	2.6	9.7	
2005	9	*B	1.9	10.1	
2006	10	3.3	3.2	13.7	12.3
2007	9	*B	5.8	12.2	
2008	11	3.5	2.1	12.7	
2009	11	3.4	2.9	12.1	
2010	11	3.4	2.9	11.3	
2011	8	3.3	3.0	12.0	
2012	10	*B	2.3	10.3	
2013	9	*B	2.6	9.9	7.8
2014	10	*B	1.1	9.1	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# LAKE RESCUE

## Ludlow, VT

**Lay Monitor:** Jim & Janine Norman  
**Former Lay Monitors:** David Hearne

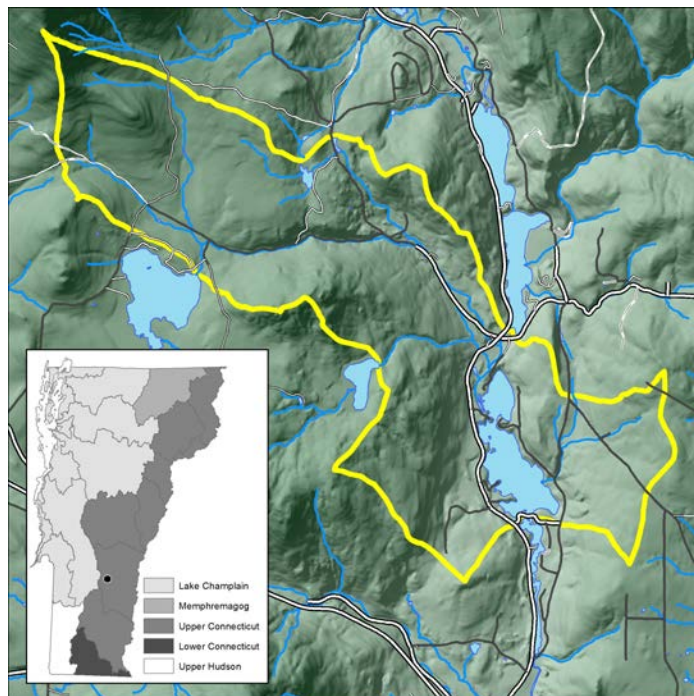
## Physical

Lake Rescue is a moderately sized, natural lake.

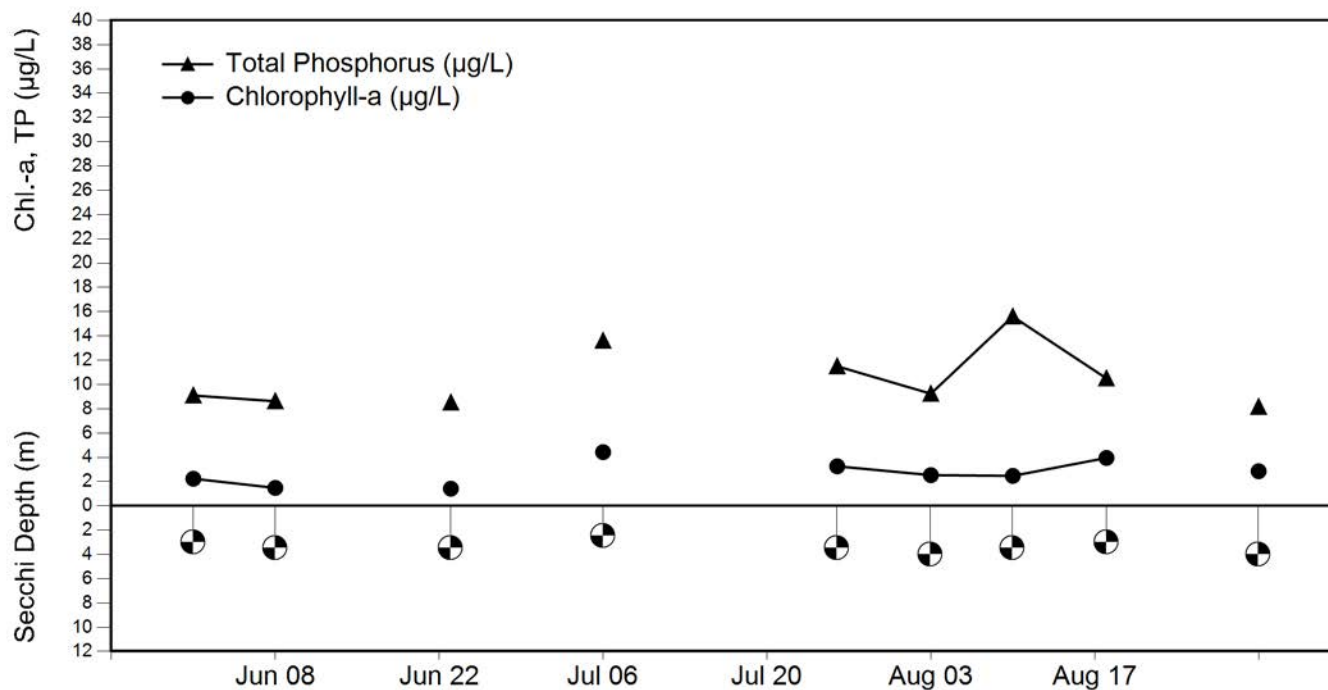
Lake Surface Area: 184 acres  
 Drainage Basin Area: 22,859 acres  
 Ratio (Basin/Lake): 124:1  
 Maximum Depth: 95 ft (29.0 m)  
 Mean Depth: 24 ft (7.3 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	2.5	3.1	4.0
Chl-a ( $\mu\text{g/L}$ )	9	1.3	2.7	4.8
Summer TP ( $\mu\text{g/L}$ )	9	8.2	10.5	15.6
Spring TP ( $\mu\text{g/L}$ )	1		12.0	



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE RESCUE

## Annual Data

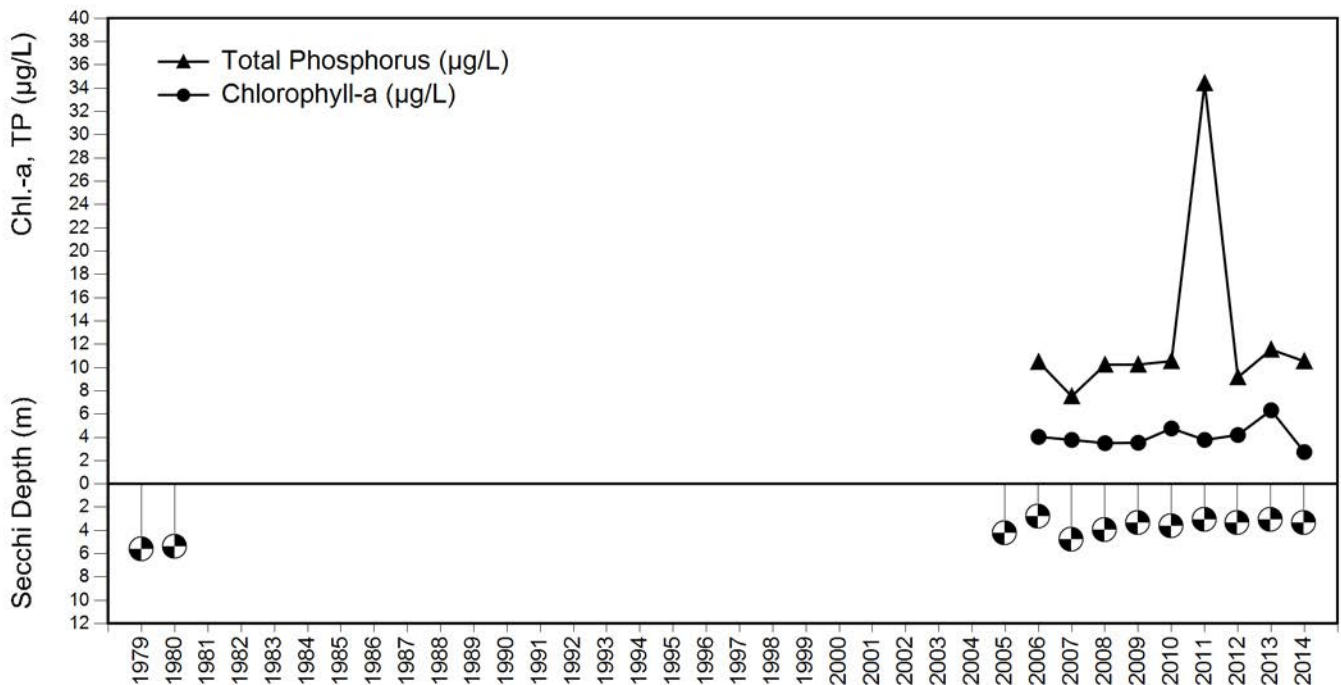
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	18	5.6			5.0
1980	6	5.4			5.0
1985					6.0
1994					4.7
1983					14.0
1981					5.0
1986					7.0
1996					7.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1998					5.7
2005	13	4.2			9.6
2006	11	2.8	4.0	10.5	
2007	11	4.8	3.8	7.5	9.0
2008	10	4.0	3.5	10.2	7.3
2009	10	3.4	3.5	10.3	7.8
2010	10	3.7	4.8	10.5	
2011	10	3.1	3.8	34.4	
2012	8	3.4	4.2	9.2	12.7
2013	10	3.1	6.3	11.5	13.2
2014	9	3.4	2.7	10.5	12.0

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE RUNNEMEDE

Windsor, VT

**Lay Monitor:** Andrew Robbins  
**Former Lay Monitors:** Michael Quinn  
 Paula Robbins  
 Donna Ewald  
 Jerry Evarts

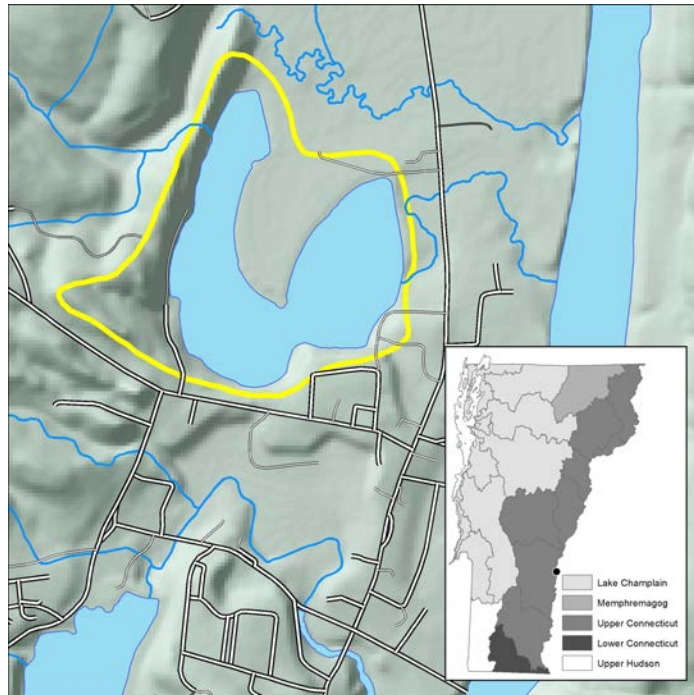
## Physical

Runnemedede is a small, warmwater lake.

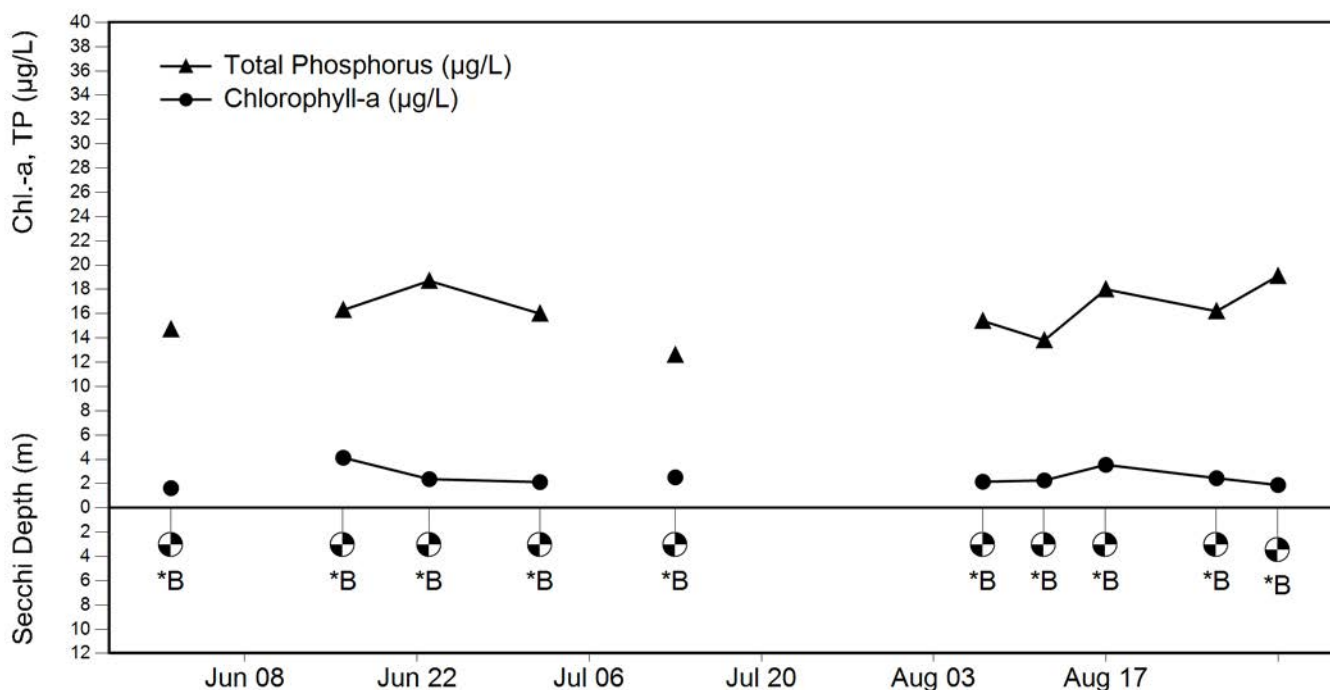
Lake Surface Area: 62 acres  
 Drainage Basin Area: 133 acres  
 Ratio (Basin:Lake): 2:1  
 Maximum Depth: 13 ft (4.0 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m) *B	10	2.2	2.7	3.5
Chl-a (µg/L)	10	1.5	2.5	4.1
Summer TP (µg/L)	10	12.6	16.1	19.1
Spring TP (µg/L)	1		24.5	



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE RUNNEMEDE

## Annual Data

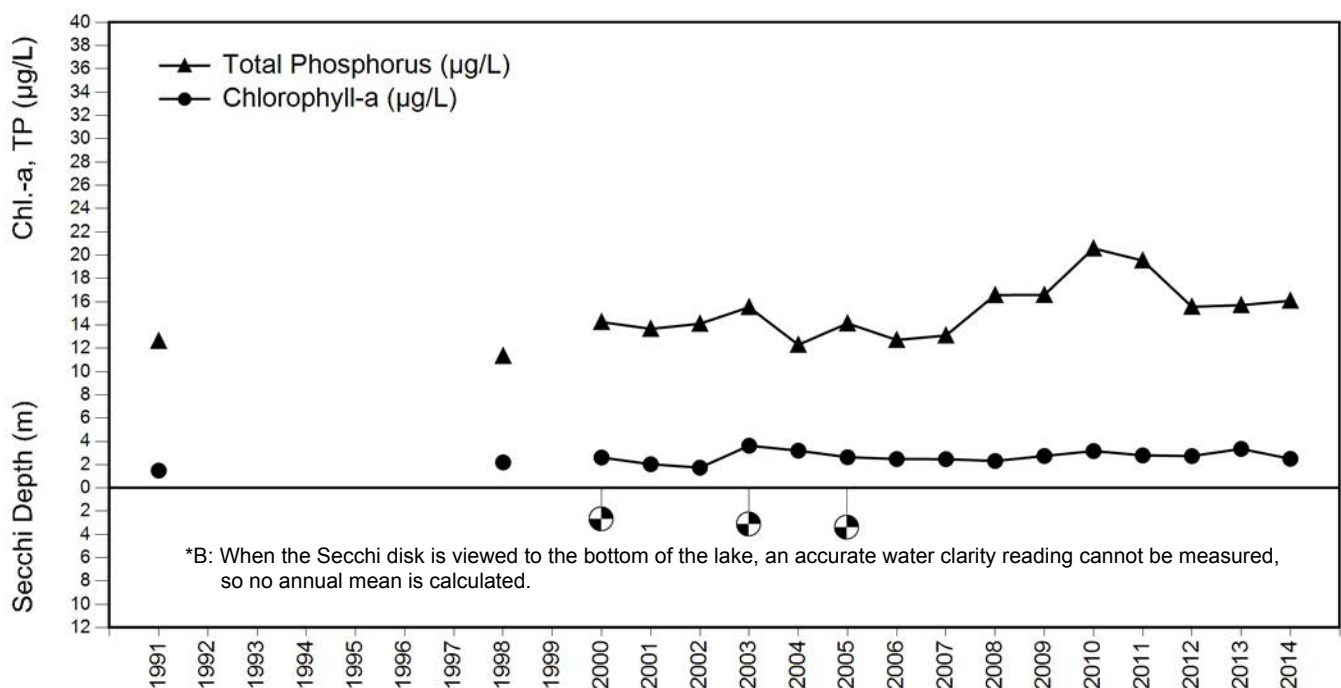
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1991	8	*B	1.5	12.6	
1980					15.0
1989					17.0
1981					16.0
1995					14.3

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1998	6	*B	2.2	11.3	
1999					18.0
2000	16	2.7	2.6	14.3	21.0
2001	19	*B	2.0	13.7	
2002	19	*B	1.7	14.1	
2003	17	3.1	3.6	15.5	
2004	16	*B	3.2	12.3	
2005	18	3.4	2.6	14.1	
2006	16	*B	2.5	12.7	
2007	15	*B	2.5	13.1	
2008	17	*B	2.3	16.6	19.7
2009	15	*B	2.7	16.6	
2010	13	*B	3.2	20.6	
2011	12	*B	2.8	19.5	
2012	11	*B	2.7	15.6	
2013	11	*B	3.4	15.7	
2014	10	*B	2.5	16.1	24.5

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# LAKE SALEM

Derby, VT

**Lay Monitors:** Claire Roberts & Paula Staples

**Former Lay** David Wood

**Monitors:**  
Bobbie Cummings  
Raymond Stabb  
Ted & Marni Surdy

## Physical

Lake Salem is a large, warmwater lake.

Lake Surface Area: 764 acres

Drainage Basin Area: 84,133 acres

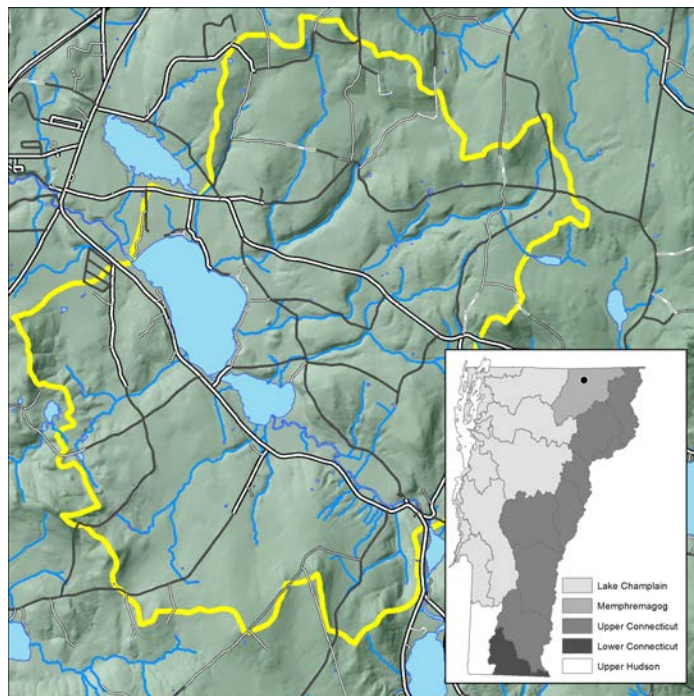
Ratio (Basin:Lake): 110:1

Maximum Depth: 70 ft (21.3 m)

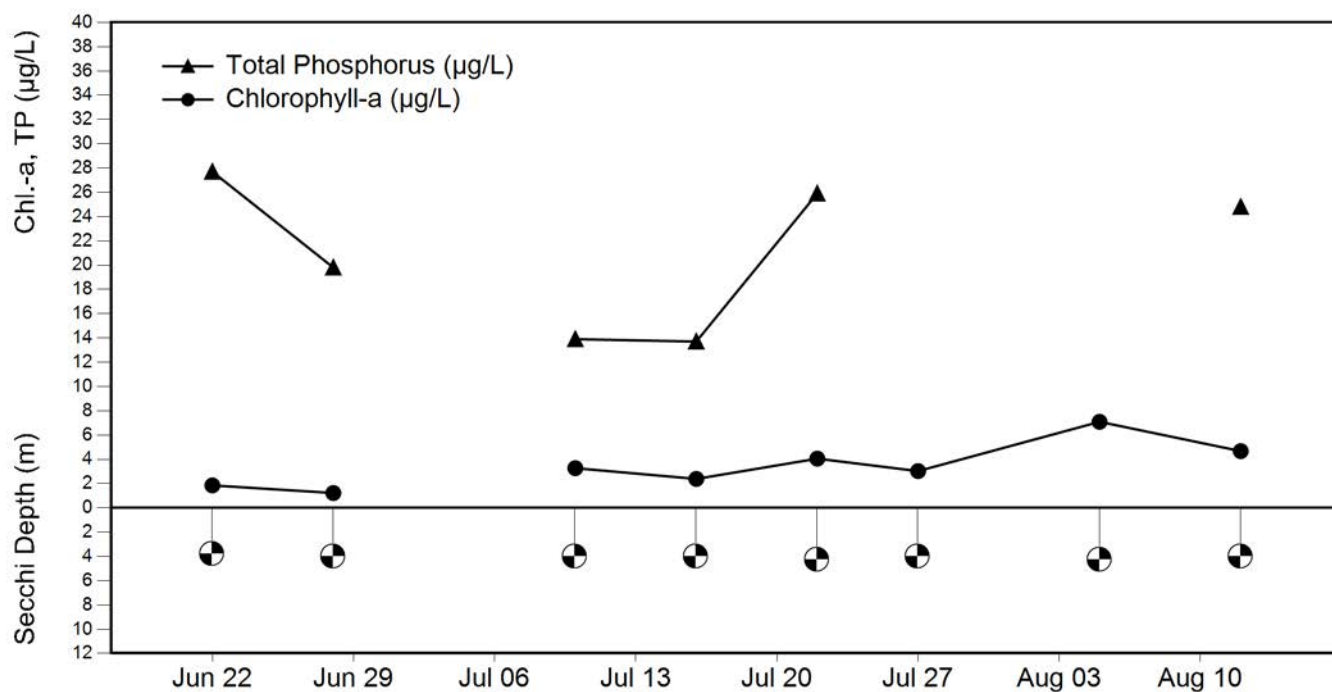
Mean Depth: 20 ft (6.1 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	8	3.8	4.2	5.3
Chl-a ( $\mu\text{g/L}$ )	8	0.5	3.5	7.2
Summer TP ( $\mu\text{g/L}$ )	6	13.7	21.0	27.7



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# LAKE SALEM

## Annual Data

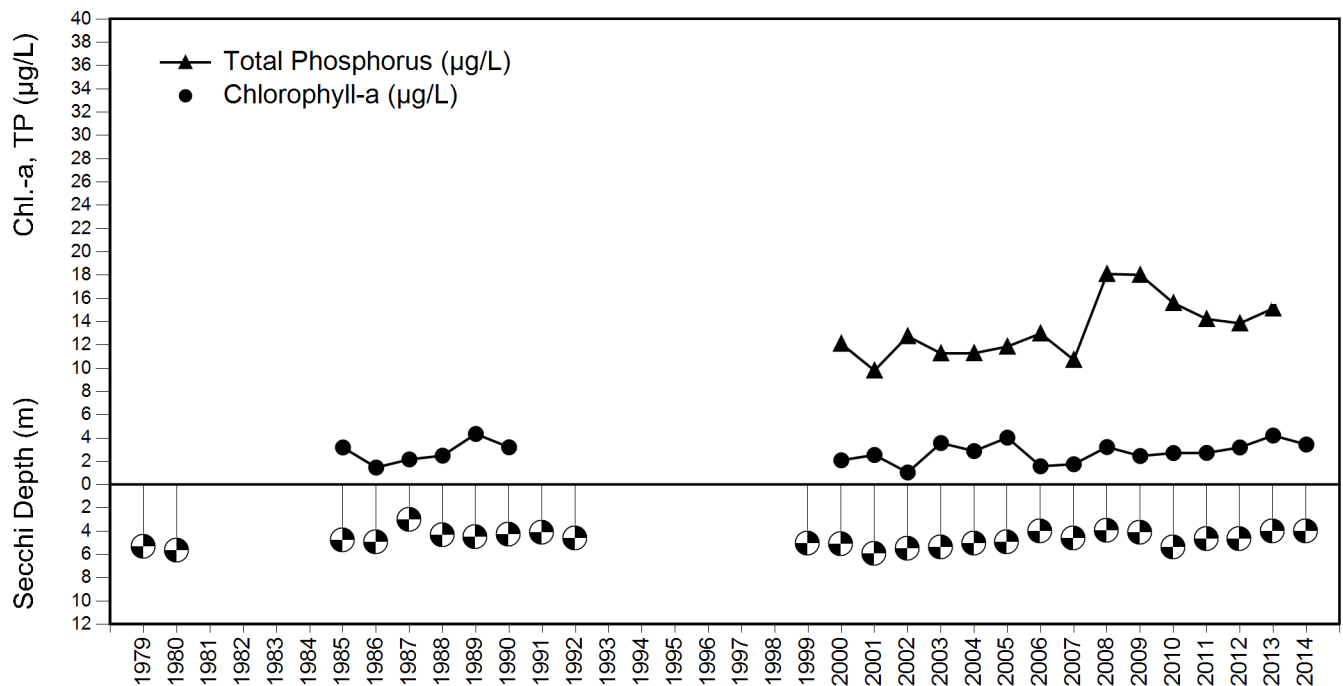
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	8	5.3			3.0
1980	8	5.7			10.0
1985	13	4.8	3.2		10.0
1986	13	5.0	1.5		10.0
1987	11	3.1	2.2		13.0
1988	12	4.4	2.5		
1989	12	4.5	4.4		
1990	12	4.3	3.2		
1991	10	4.2			
1992	12	4.6			
1981					12.0
1983					13.0
1995					8.7
1982					14.0
1984					10.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1999	9	5.1			9.3
2000	9	5.2	2.1	12.1	11.3
2001	10	5.9	2.5	9.8	
2002	9	5.5	1.0	12.8	
2003	11	5.4	3.6	11.3	
2004	12	5.1	2.9	11.3	11.0
2005	11	5.0	4.0	11.9	
2006	12	4.0	1.6	13.0	
2007	10	4.6	1.8	10.7	13.0
2008	11	4.0	3.2	18.1	
2009	10	4.1	2.5	18.0	
2010	9	5.4	2.7	15.6	
2011	8	4.7	2.7	14.2	
2012	10	4.7	3.2	13.9	
2013	9	4.0	4.2	15.1	
2014	8	4.1	3.4	21.0	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE ST. CATHERINE

## Poultney and Wells, VT

**Lay Monitor:** Mary Jo Teetor  
**Former Lay Monitors:** Vincent Meyers  
 Harry Spindler  
 Tom Hayden  
 Phil Alden  
 Katherine Bell

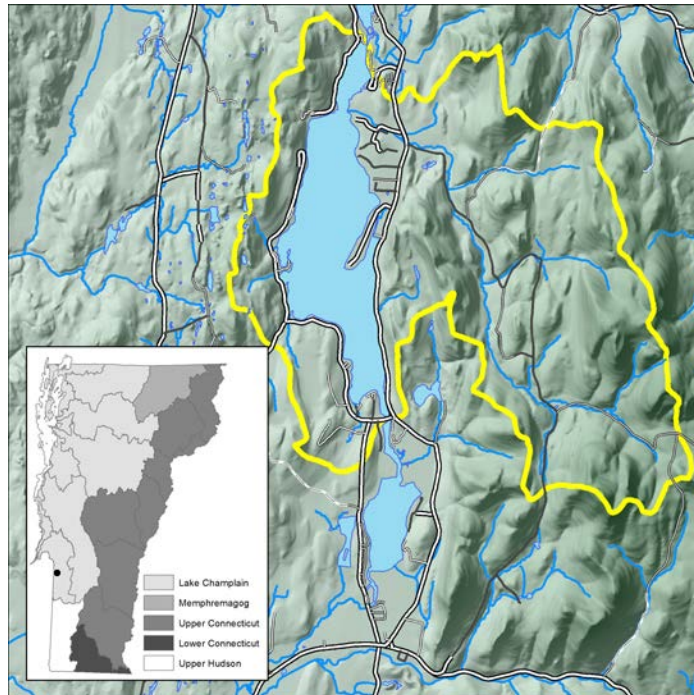
## Physical

Lake St. Catherine is a large, coldwater lake.

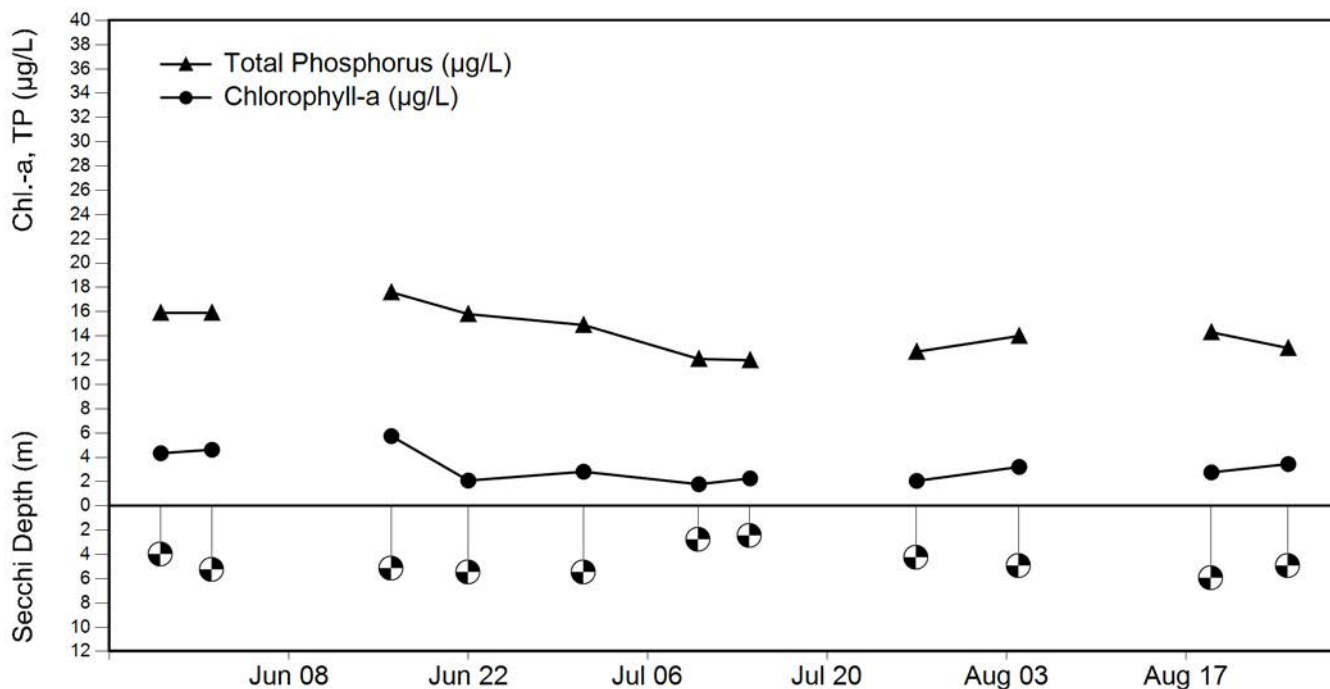
Lake Surface Area: 904 acres  
 Drainage Basin Area: 7,447 acres  
 Ratio (Basin:Lake): 8:1  
 Maximum Depth: 68 ft (20.7 m)  
 Mean Depth: 37 ft (11.3 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	11	2.5	4.6	6.0
Chl-a ( $\mu\text{g/L}$ )	11	1.4	3.2	6.0
Summer TP ( $\mu\text{g/L}$ )	11	12.0	14.4	17.6



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LAKE ST. CATHERINE

## Annual Data

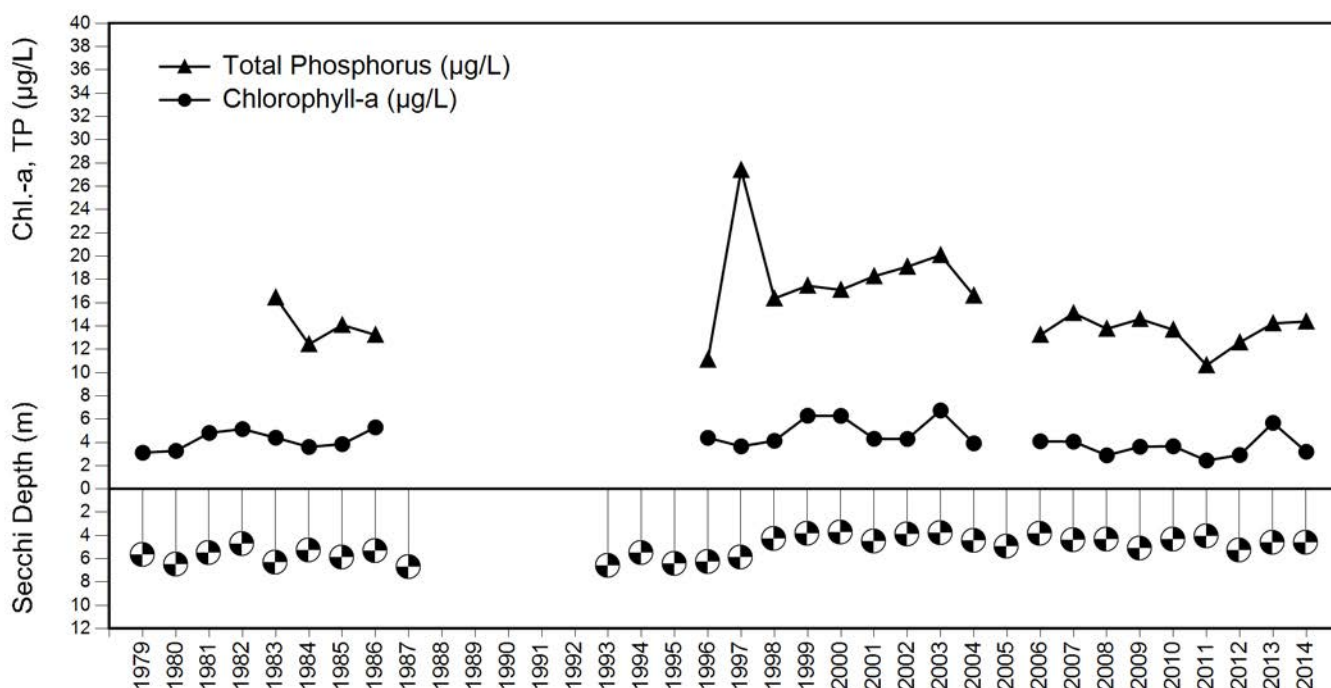
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	24	5.7	3.1		10.0
1980	14	6.5	3.3		12.0
1981	14	5.5	4.8		18.0
1982	13	4.7	5.1		19.0
1983	13	6.4	4.4	16.4	16.0
1984	13	5.3	3.6	12.4	15.0
1985	13	5.9	3.8	14.1	13.0
1986	13	5.4	5.3	13.2	12.0
1987	12	6.7			17.0
1993	13	6.6			
1994	12	5.5			10.3
1995	10	6.5			13.7
1996	13	6.3	4.4	11.1	15.3

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	7	5.9	3.7	27.4	
1998	11	4.3	4.1	16.4	13.3
1999	12	3.9	6.3	17.5	14.7
2000	10	3.7	6.3	17.1	12.0
2001	11	4.5	4.3	18.3	10.3
2002	11	3.9	4.3	19.1	14.7
2003	11	3.8	6.7	20.1	
2004	10	4.5	3.9	16.6	13.7
2005	8	5.0			13.4
2006	10	3.9	4.1	13.2	17.9
2007	10	4.4	4.1	15.1	19.0
2008	9	4.4	2.9	13.8	11.4
2009	11	5.1	3.6	14.6	16.7
2010	11	4.4	3.7	13.7	
2011	8	4.1	2.4	10.6	
2012	11	5.3	2.9	12.6	17.8
2013	10	4.7	5.7	14.2	
2014	11	4.6	3.2	14.4	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# LITTLE LAKE OF LAKE ST. CATHERINE

Poultney and Wells, VT

Lay Monitor: Mary Jo Teetor

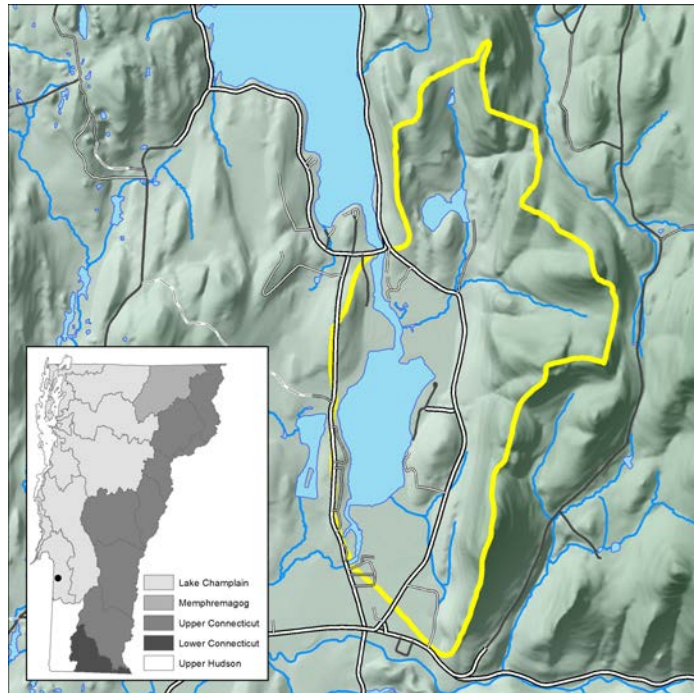
## Physical

Little Lake is a small, shallow, warmwater lake.

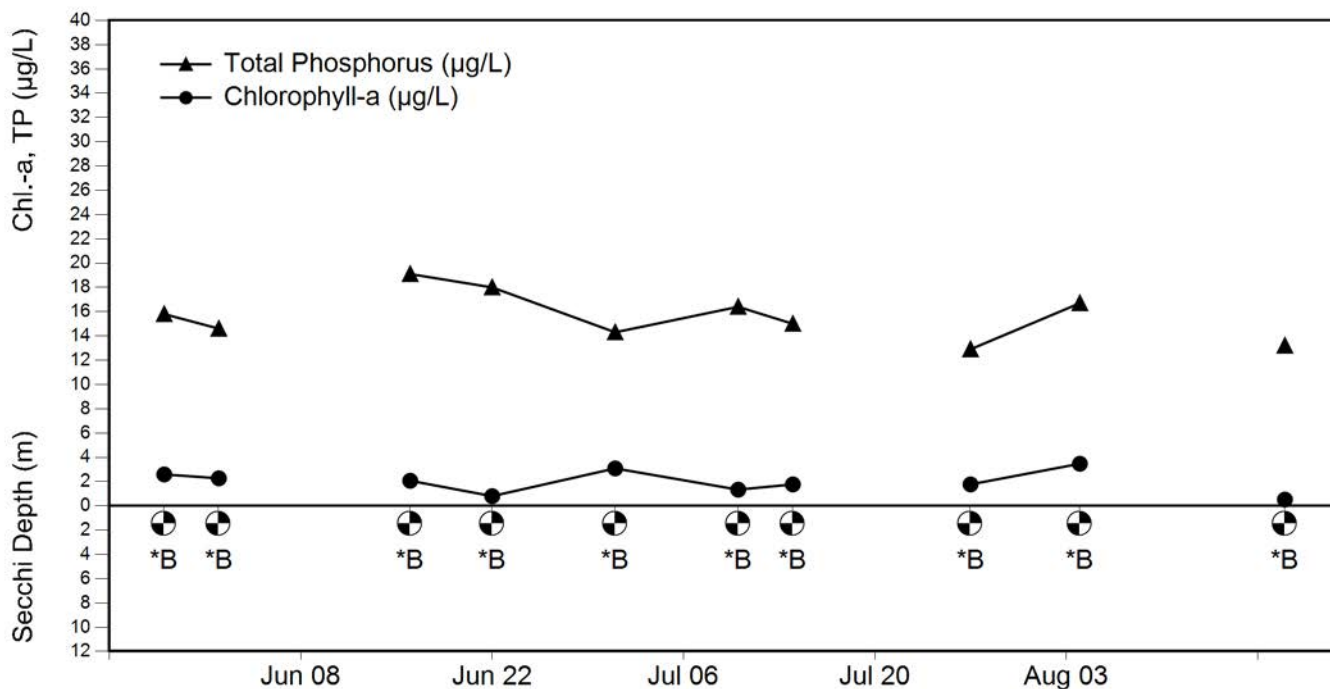
Lake Surface Area: 162 acres  
 Drainage Basin Area: 8,989 acres  
 Ratio (Basin:Lake): 56:1  
 Maximum Depth: 5 ft (1.5 m)  
 Mean Depth: 4 ft (1.2 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m) *B	11	1.5	1.5	1.8
Chl-a (µg/L)	10	0.5	2.0	4.5
Summer TP (µg/L)	10	12.9	15.6	19.1



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



## LITTLE LAKE of LAKE ST. CATHERINE

### Annual Data

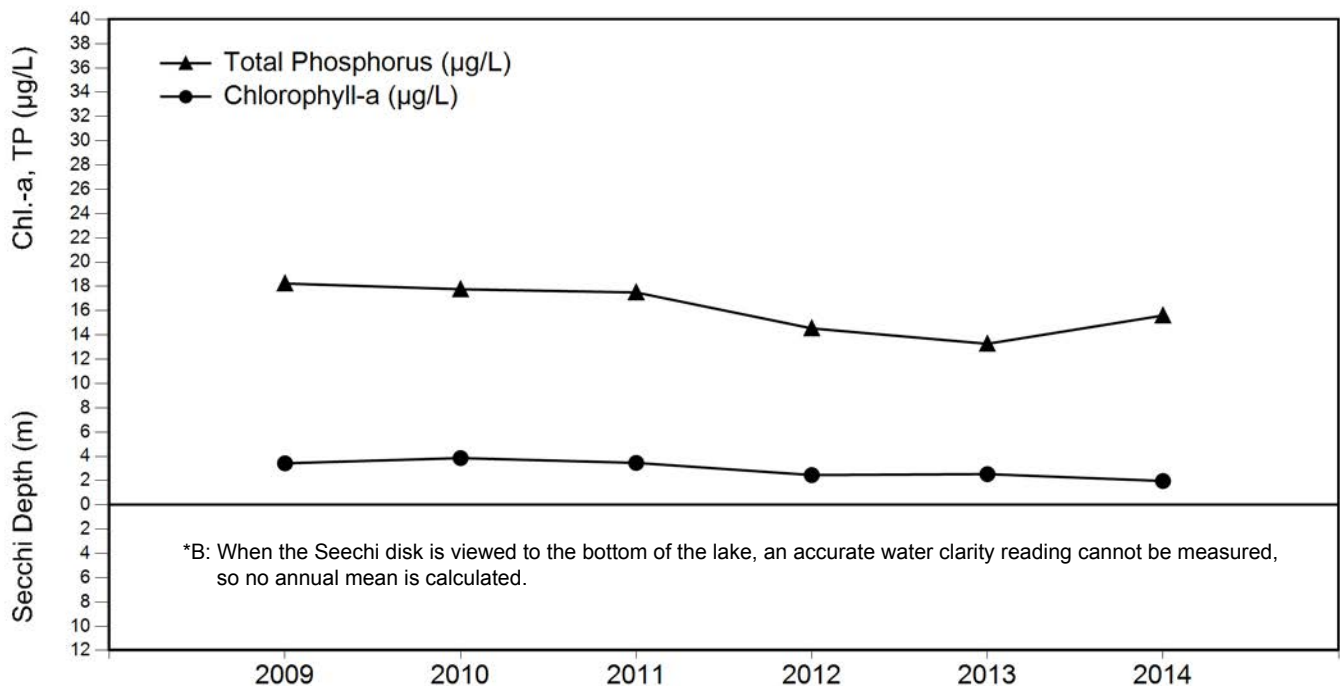
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1985					11.0
1987					22.0
1994					10.0
1980					8.0
1984					12.0
1979					8.0
1986					16.0
1983					15.0

### Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1998					13.0
2002					12.3
2008					8.1
2009	11	*B	3.4	18.2	11.9
2010	11	*B	3.9	17.8	
2011	7	*B	3.5	17.5	
2012	10	*B	2.5	14.5	12.5
2013	10	*B	2.5	13.3	
2014	10	*B	2.0	15.6	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

**Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth**





# SEYMOUR LAKE

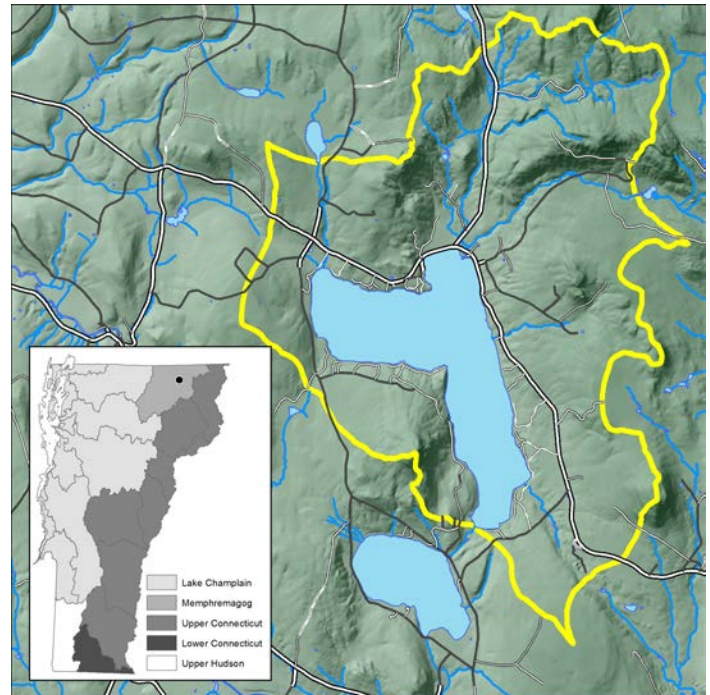
## Morgan and Charleston, VT

**Lay Monitor:** Tom Emery  
**Former Lay** Andrew Emery  
**Monitors:** Joseph & Anna Puente  
 Dan Barry  
 Harold Kimball  
 Robert Arnold

### Physical

Seymour Lake is a large, deep, coldwater lake.

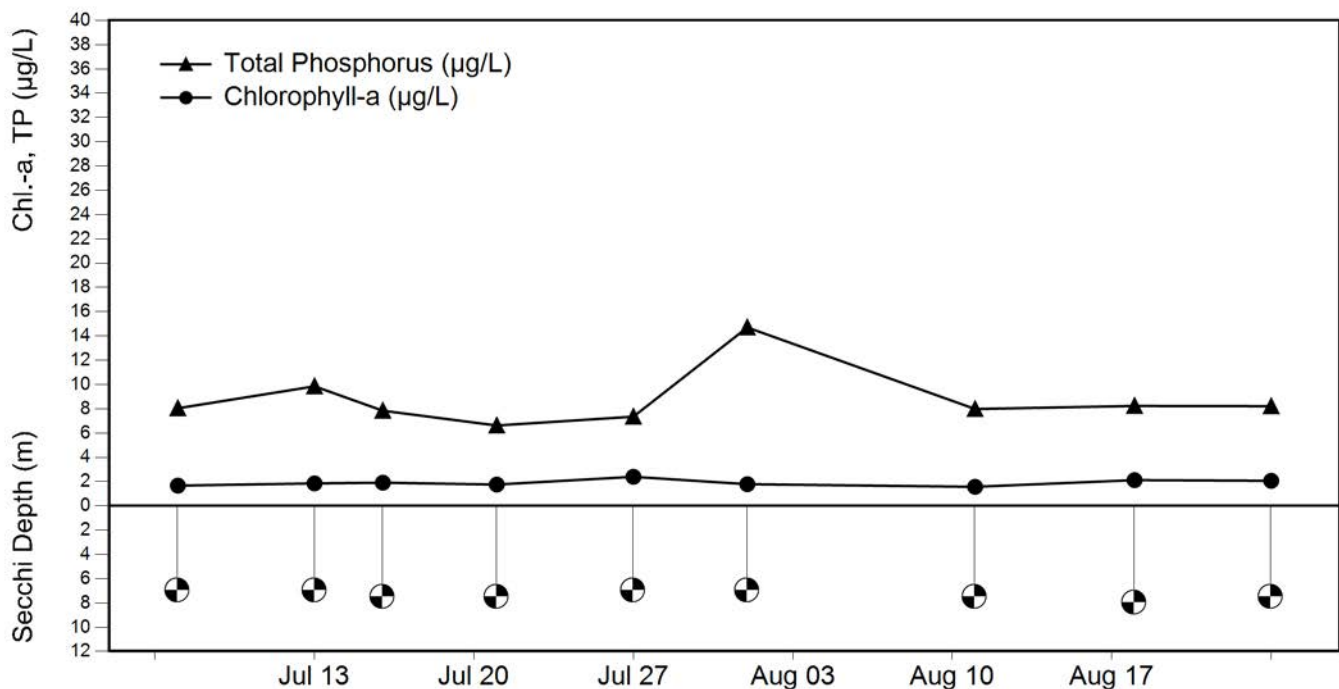
Lake Surface Area: 1,769 acres  
 Drainage Basin Area: 12,920 acres  
 Ratio (Basin:Lake): 7:1  
 Maximum Depth: 167 ft (50.9 m)  
 Mean Depth: 70 ft (21.3 m)



### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	6.5	7.3	8.0
Chl-a ( $\mu\text{g/L}$ )	9	1.5	1.9	2.5
Summer TP ( $\mu\text{g/L}$ )	9	6.6	8.8	14.7
Spring TP ( $\mu\text{g/L}$ )	1		9.3	

### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# SEYMOUR LAKE

## Annual Data

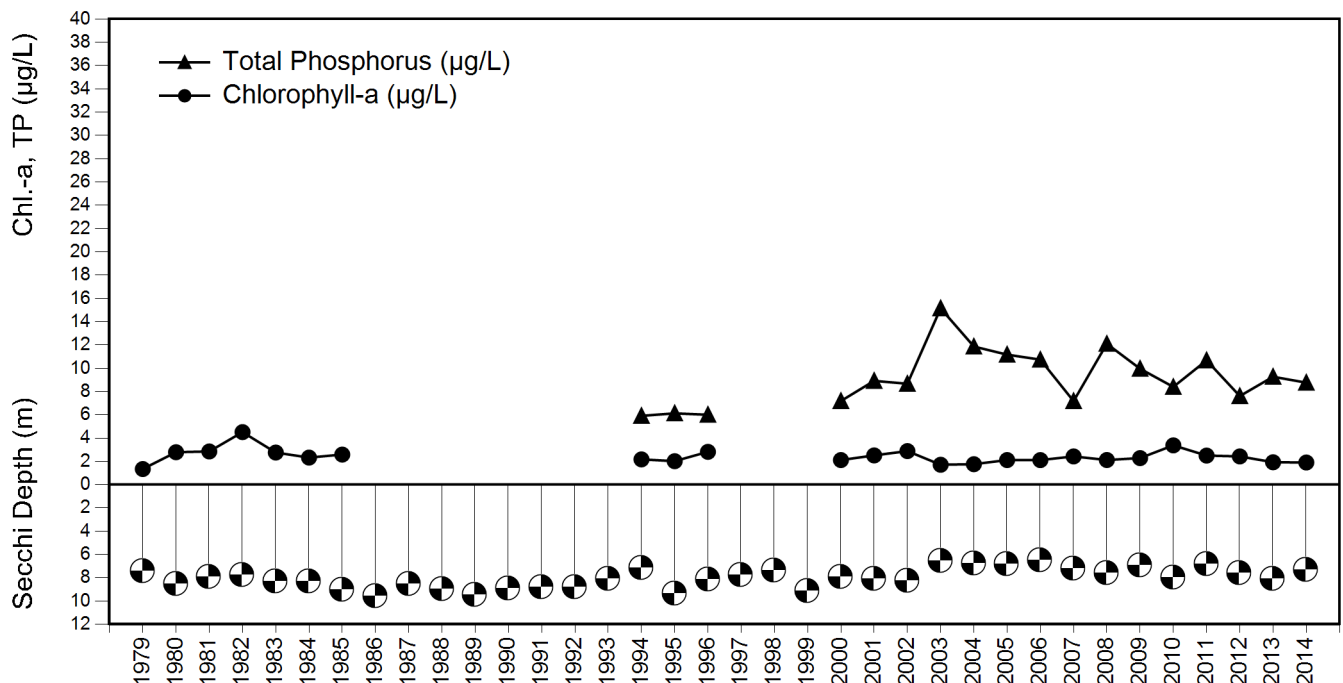
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	15	7.4	1.3		4.0
1980	13	8.5	2.8		9.0
1981	13	8.0	2.8		5.0
1982	13	7.8	4.5		10.0
1983	14	8.4	2.8		5.0
1984	13	8.3	2.3		8.0
1985	13	9.0	2.6		9.0
1986	12	9.6			8.0
1987	14	8.6			10.0
1988	13	9.0			
1989	12	9.5			
1990	14	8.9			
1991	13	8.8			
1992	12	8.8			
1993	13	8.1			
1994	13	7.2	2.2	5.9	5.7
1995	8	9.4	2.0	6.1	6.3
1996	8	8.2	2.8	6.0	

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	13	7.8			
1998	11	7.4			6.0
1999	14	9.2			
2000	11	8.0	2.1	7.2	9.0
2001	12	8.1	2.5	8.9	
2002	9	8.3	2.9	8.7	
2003	8	6.6	1.7	15.1	
2004	11	6.8	1.8	11.9	
2005	12	6.8	2.1	11.2	
2006	11	6.5	2.1	10.7	11.4
2007	10	7.2	2.4	7.2	10.4
2008	10	7.6	2.1	12.1	8.6
2009	10	6.9	2.3	10.0	10.2
2010	11	8.0	3.4	8.4	15.9
2011	10	6.9	2.5	10.7	
2012	10	7.6	2.4	7.6	8.2
2013	11	8.1	1.9	9.3	8.8
2014	9	7.3	1.9	8.8	9.3

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# SHADOW LAKE

Glover, VT

**Lay Monitor:** Larry and Sara Gluckman  
**Former Lay Monitors:** Ed and Linda Zalenski  
 Susan Alexander

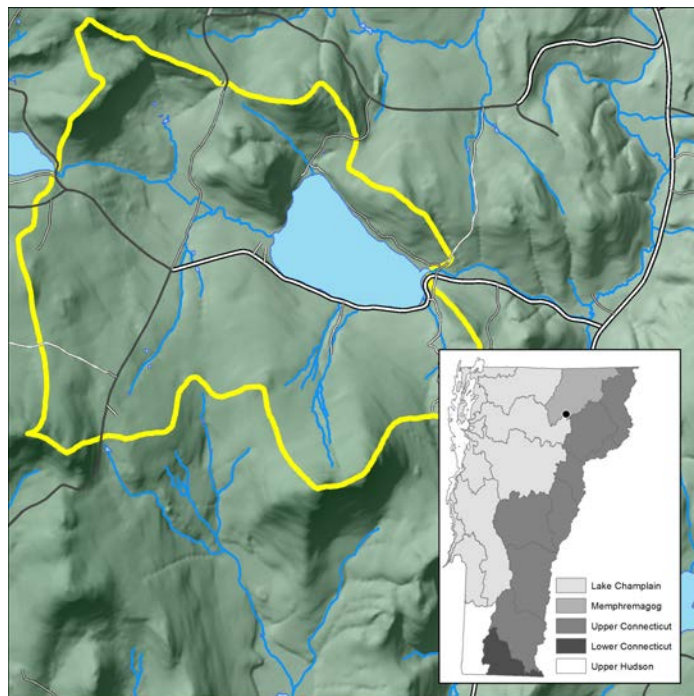
## Physical

Shadow Lake is a small, deep, coldwater lake.

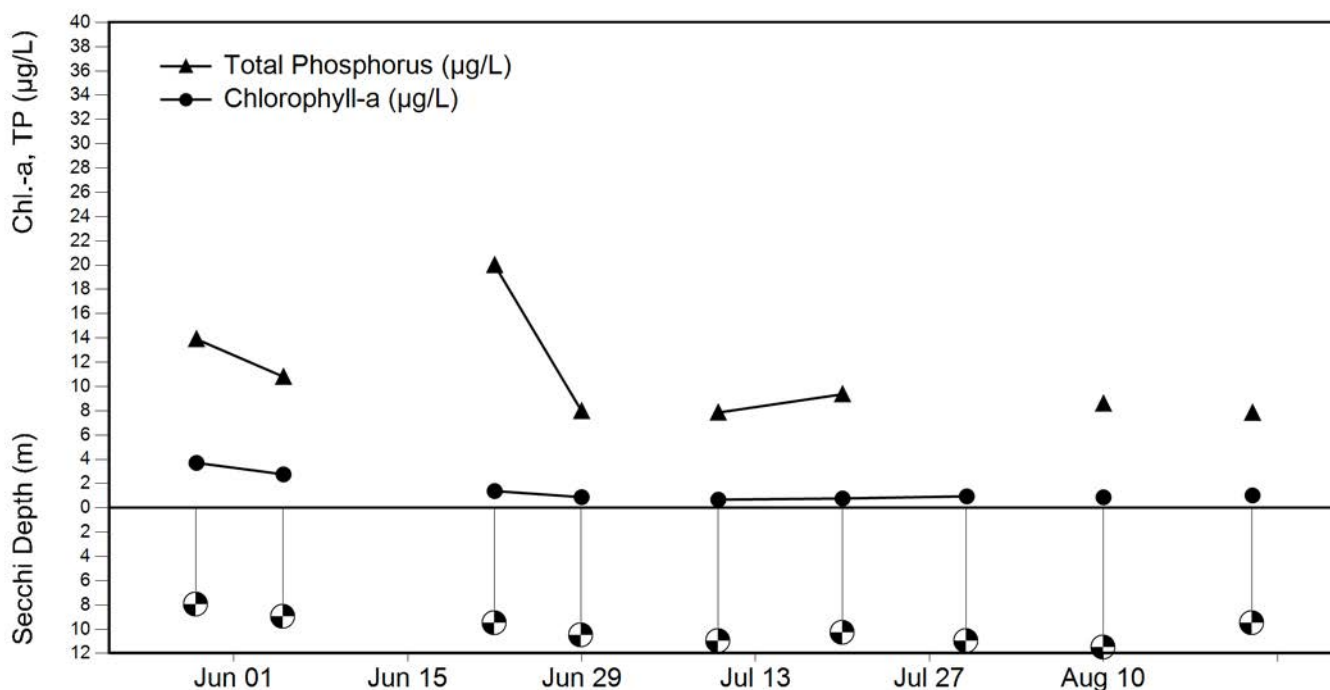
Lake Surface Area: 210 acres  
 Drainage Basin Area: 3,575 acres  
 Ratio (Basin:Lake): 17:1  
 Maximum Depth: 139 ft (42.4 m)  
 Mean Depth: 55 ft (16.8 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	7.5	10.1	12.0
Chl-a ( $\mu\text{g/L}$ )	9	0.7	1.4	3.7
Summer TP ( $\mu\text{g/L}$ )	8	7.8	10.8	20.0
Spring TP ( $\mu\text{g/L}$ )	1		12.1	



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# SHADOW LAKE

## Annual Data

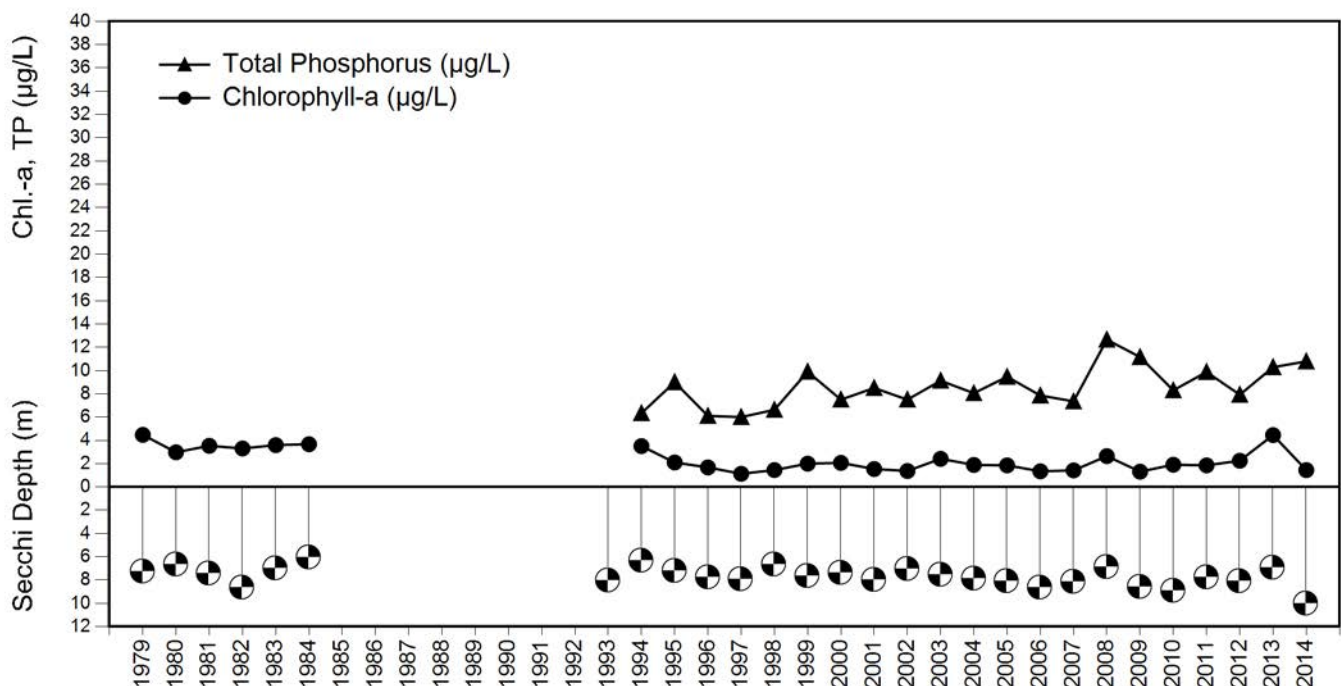
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	17	7.3	4.5		4.0
1980	14	6.7	3.0		6.0
1981	13	7.4	3.5		7.0
1982	13	8.7	3.3		6.0
1983	13	7.0	3.6		7.0
1984	9	6.1	3.7		5.0
1993	5	8.1			10.3
1994	9	6.3	3.5	6.3	
1995	10	7.2	2.1	9.0	
1996	10	7.8	1.7	6.1	
1985					6.0
1987					6.0
1986					9.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	9	7.9	1.1	6.0	
1998	8	6.7	1.4	6.6	
1999	10	7.7	2.0	9.9	9.7
2000	10	7.4	2.1	7.5	9.7
2001	10	8.0	1.5	8.5	5.7
2002	10	7.1	1.4	7.5	
2003	9	7.6	2.4	9.1	
2004	10	7.9	1.9	8.1	7.3
2005	9	8.1	1.9	9.5	
2006	9	8.7	1.3	7.9	
2007	10	8.2	1.4	7.4	11.2
2008	9	6.9	2.6	12.7	
2009	10	8.6	1.3	11.2	9.1
2010	9	8.9	1.9	8.3	10.1
2011	10	7.8	1.9	9.9	
2012	10	8.1	2.3	7.9	11.9
2013	9	7.0	4.5	10.3	
2014	9	10.0	1.4	10.8	12.1

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# SILVER LAKE

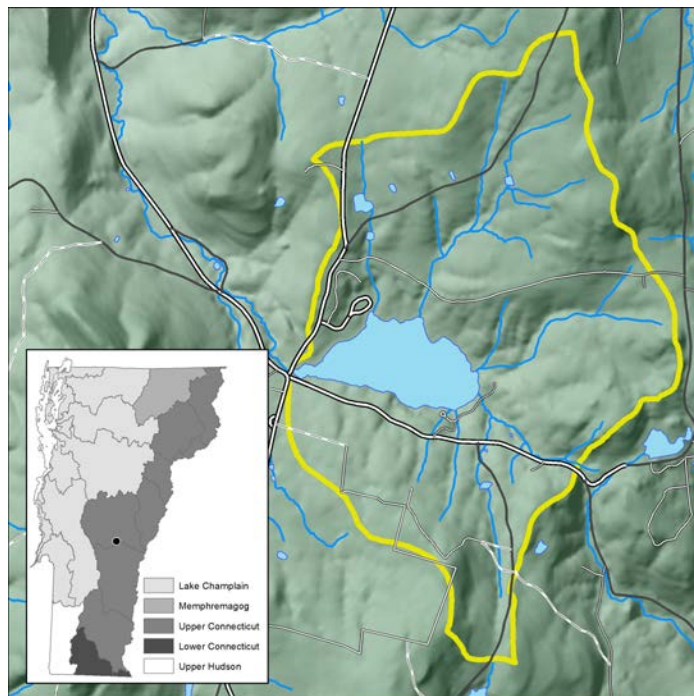
Barnard, VT

**Lay Monitor:** Craig Hadden  
**Former Lay Monitors:** Lloyd & Susanne Rudolph  
 Don Munro  
 Jack Frake  
 George Roy

## Physical

Silver Lake is a small, warmwater lake.

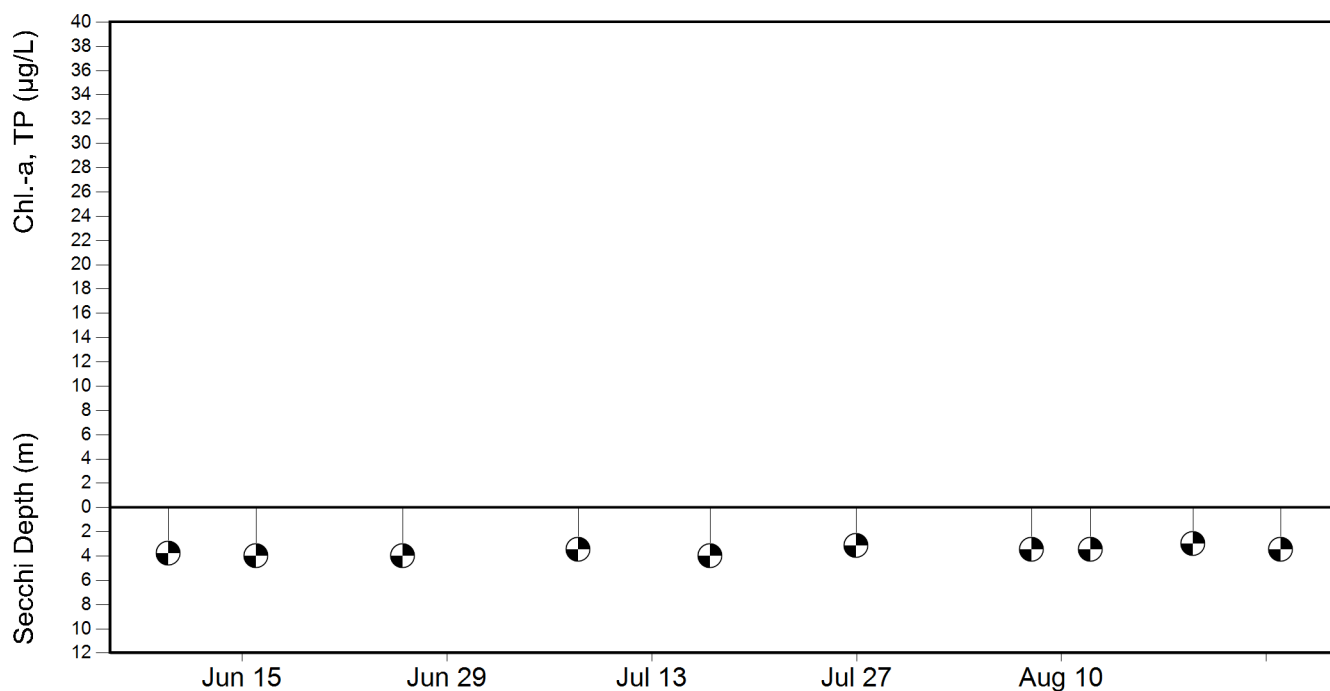
Lake Surface Area: 84 acres  
 Drainage Basin Area: 1,091 acres  
 Ratio (Basin:Lake): 13:1  
 Maximum Depth: 32 ft (9.8 m)  
 Mean Depth: 16 ft (4.9 m)



## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	10	3.0	3.6	4.3

## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# SILVER LAKE

## Annual Data

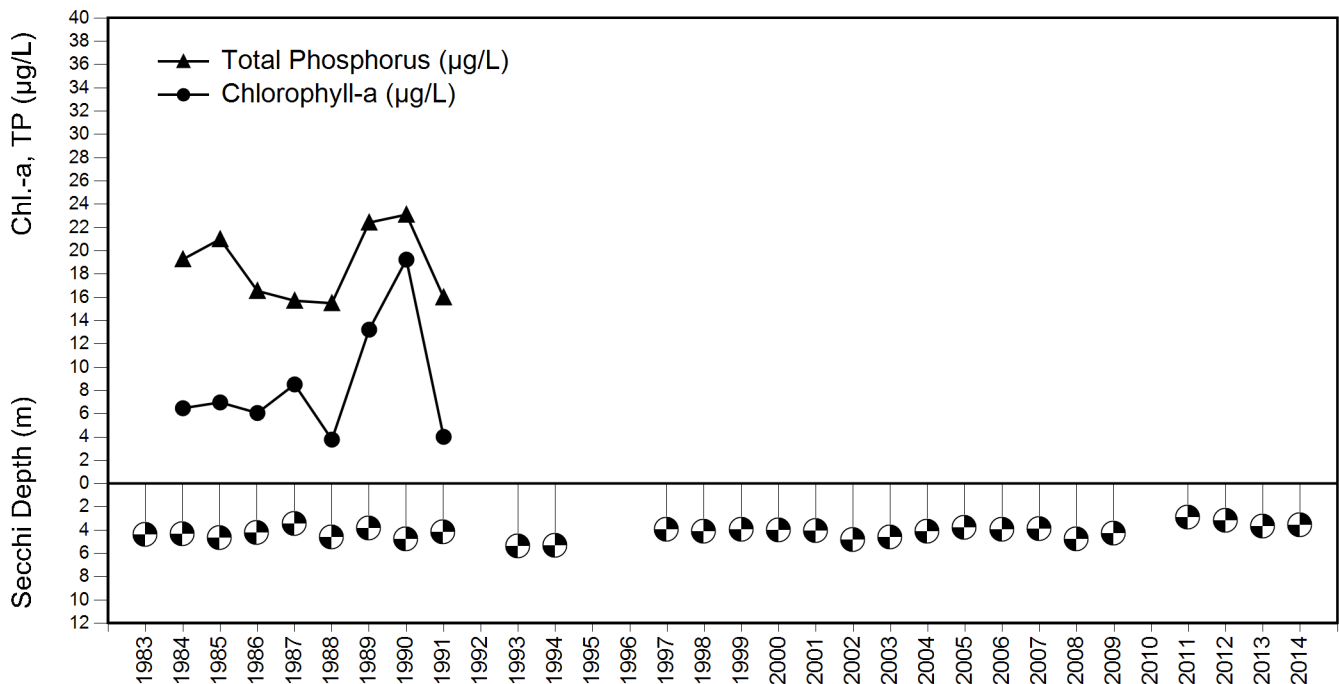
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1983	10	4.4			24.0
1984	11	4.4	6.5	19.3	17.0
1985	9	4.7	7.0	21.0	15.0
1986	9	4.3	6.1	16.6	11.0
1987	10	3.5	8.5	15.7	9.0
1988	8	4.6	3.8	15.5	11.0
1989	8	3.9	13.2	22.4	20.0
1990	10	4.8	19.2	23.1	
1991	5	4.2	4.0	16.0	
1993	9	5.4			
1994	4	5.4			
1979					12.0
1981					7.0
1996					16.0
1982					13.0
1980					17.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	14	4.0			11.3
1998	8	4.2			
1999	5	4.0			
2000	6	4.0			
2001	9	4.1			11.3
2002	8	4.8			
2003	9	4.7			
2004	8	4.1			
2005	9	3.8			
2006	9	4.0			17.3
2007	10	3.9			
2008	9	4.8			
2009	9	4.3			
2011	6	2.9			11.5
2012	12	3.2			
2013	11	3.7			
2014	10	3.6			

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	> 14

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# SOUTH POND

Eden, VT

**Lay Monitors:** Chandler & Madonna Parker

## Physical

South Pond is a moderately sized, warmwater lake.

Lake Surface Area: 103 acres

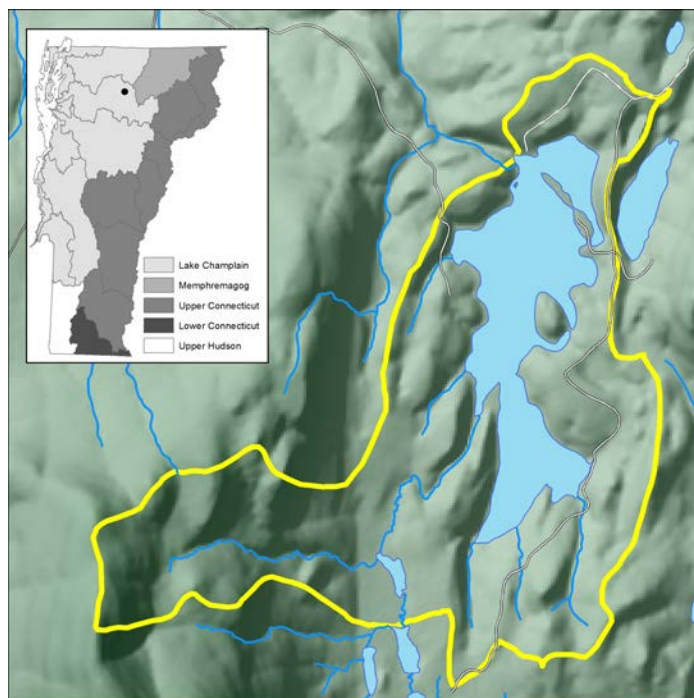
Drainage Basin Area: 1,382 acres

Ratio (Basin:Lake): 13:1

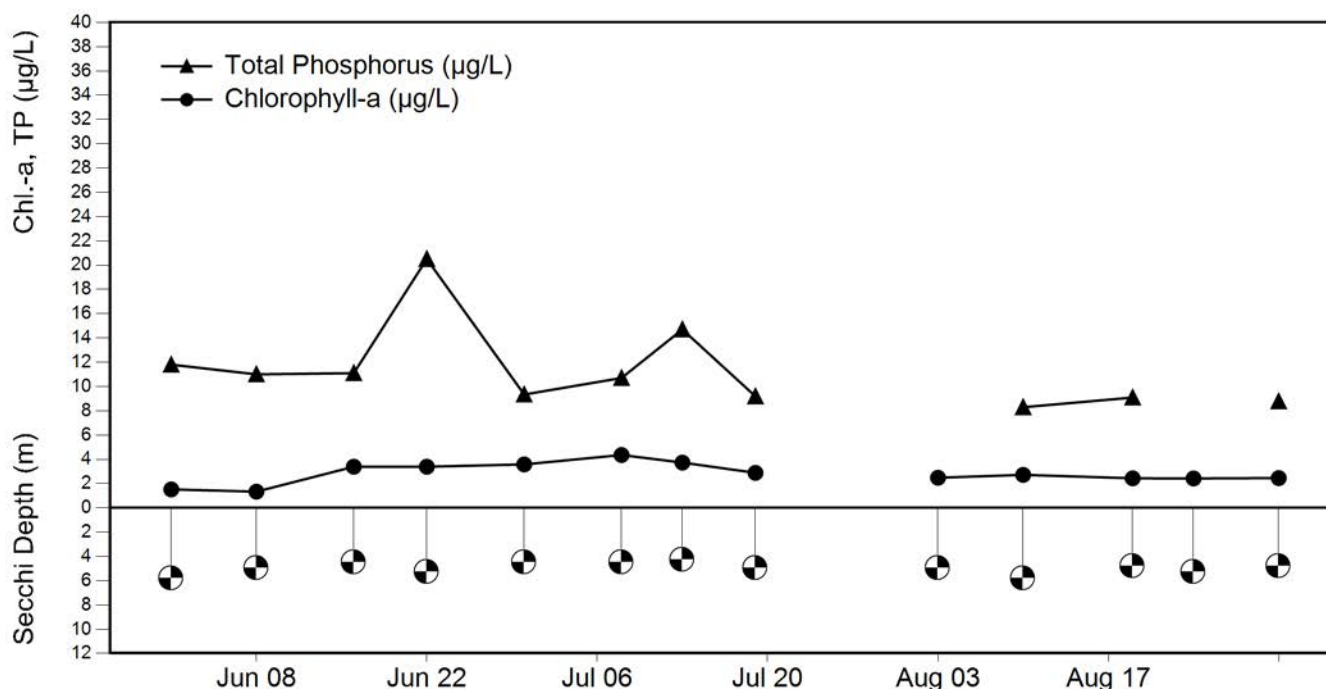
Maximum Depth: 66 ft (20.1 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	13	4.0	5.1	6.5
Chl-a ( $\mu\text{g/L}$ )	13	0.6	2.8	4.4
Summer TP ( $\mu\text{g/L}$ )	11	8.3	11.3	20.5



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



## SOUTH POND

### Annual Data

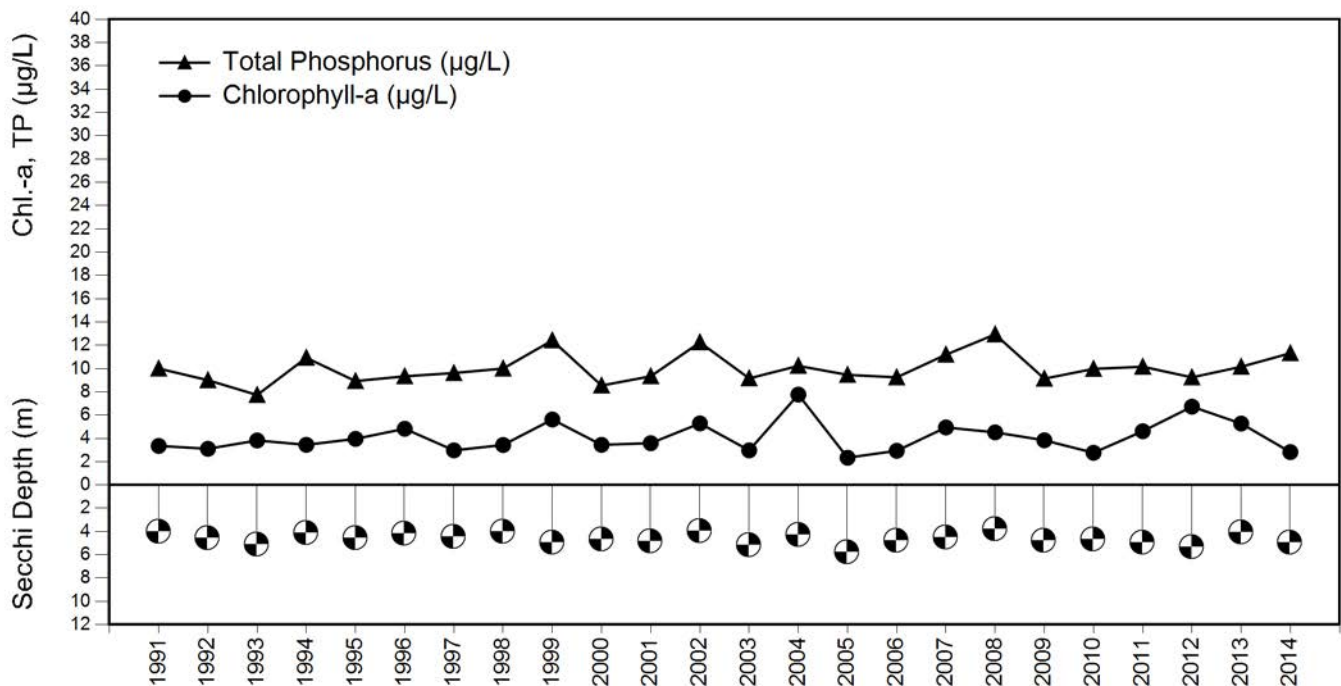
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1991	11	4.0	3.4	10.0	
1992	13	4.6	3.1	9.0	
1993	13	5.2	3.8	7.7	
1994	13	4.2	3.4	10.9	
1995	13	4.6	4.0	8.9	
1996	12	4.2	4.8	9.3	
1979					14.0

### Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	13	4.5	3.0	9.6	
1998	11	4.1	3.4	10.0	5.7
1999	12	5.0	5.6	12.4	8.3
2000	13	4.7	3.4	8.5	8.7
2001	12	4.9	3.6	9.3	
2002	12	4.0	5.3	12.3	
2003	13	5.2	3.0	9.2	
2004	12	4.3	7.8	10.2	
2005	11	5.8	2.3	9.5	
2006	11	4.8	2.9	9.2	
2007	12	4.5	4.9	11.2	12.8
2008	12	3.8	4.5	12.9	
2009	12	4.8	3.8	9.1	
2010	12	4.7	2.8	10.0	
2011	12	4.9	4.6	10.2	10.7
2012	12	5.3	6.7	9.2	
2013	10	4.1	5.3	10.2	
2014	13	5.0	2.8	11.3	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

### Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# SUNRISE LAKE

Benson and Orwell, VT

**Lay Monitor:** Richard Moesch  
**Former Lay Monitors:** Dolores, Frank, Nick Mobilio

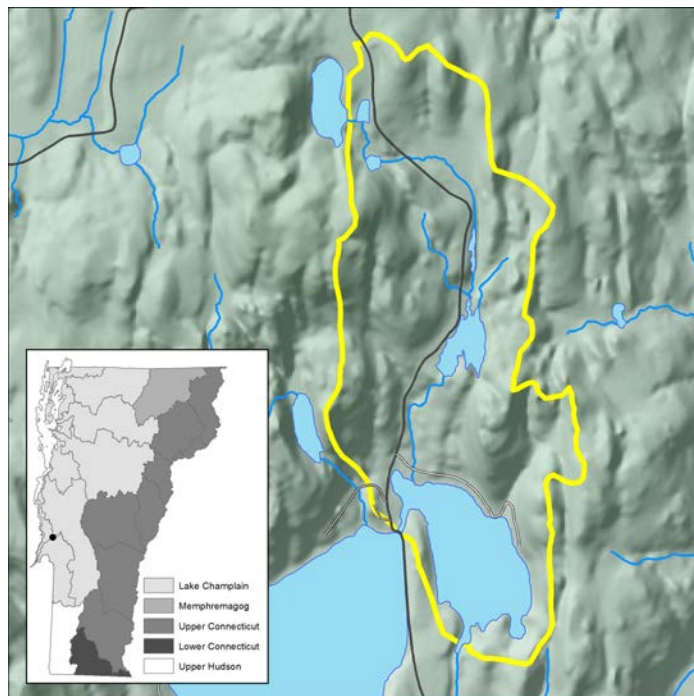
## Physical

Sunrise Lake is a small, warmwater lake.

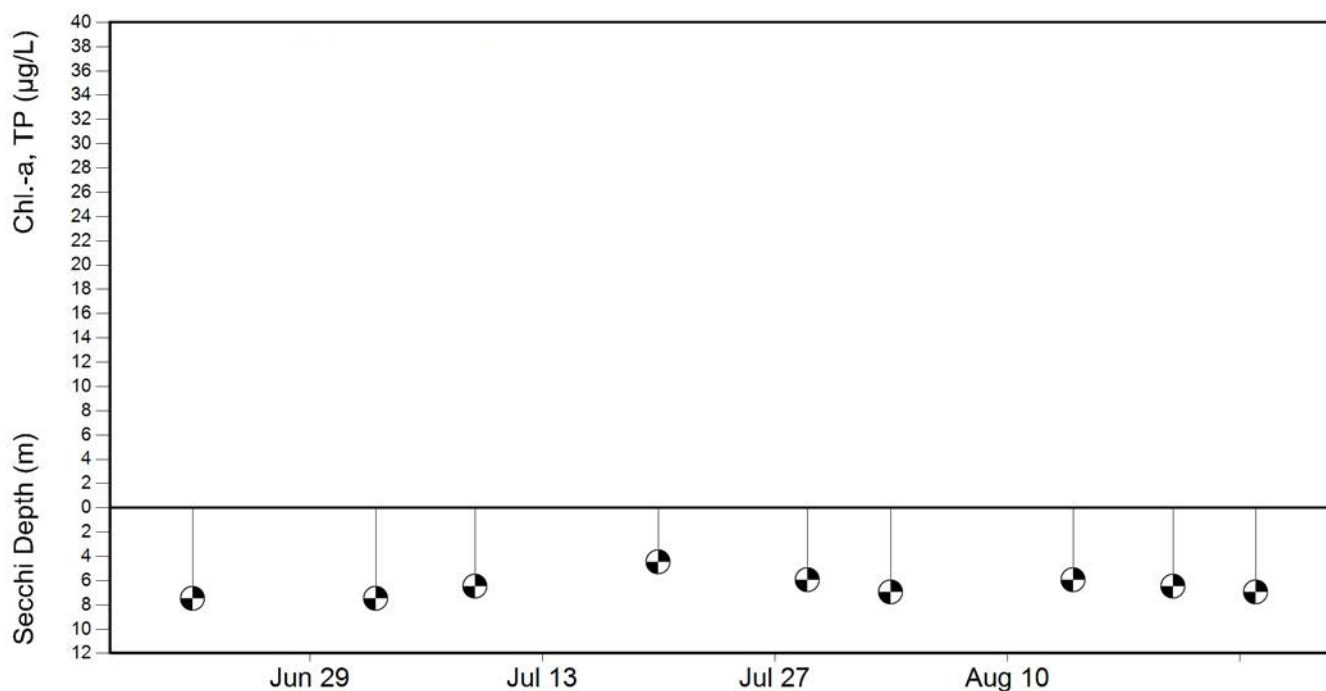
Lake Surface Area: 57 acres  
 Drainage Basin Area: 1,775 acres  
 Ratio (Basin:Lake): 31:1  
 Maximum Depth: 43 ft (13.1 m)  
 Mean Depth: 26 ft (7.9 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	4.5	6.6	7.5



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# SUNRISE LAKE

## Annual Data

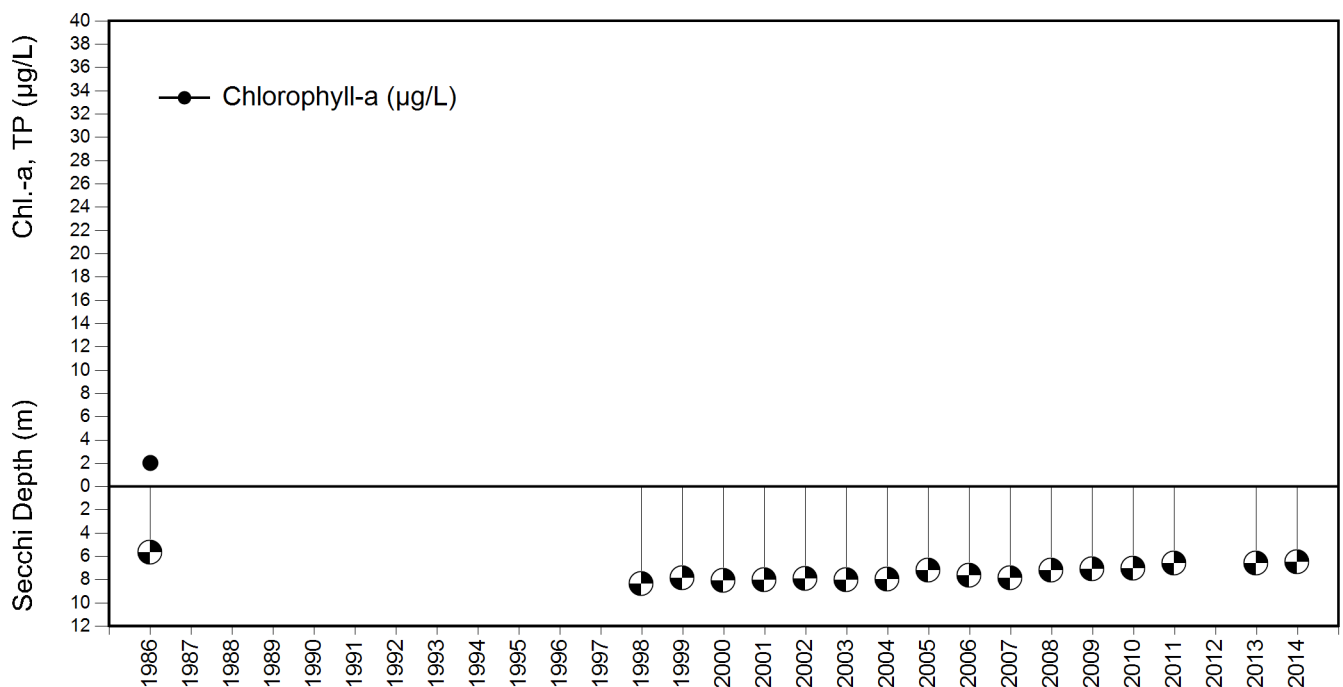
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1986	9	5.7	2.0		15.0
1979					12.0
1996					14.0
1989					20.0
1987					16.0
1980					14.0
1990					15.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1998	12	8.4			15.3
1999	12	7.9			
2000	11	8.1			
2001	14	8.1			
2002	12	7.9			12.3
2003	10	8.1			
2004	10	8.0			16.3
2005	10	7.2			
2006	11	7.6			12.8
2007	10	7.9			
2008	10	7.2			
2009	10	7.1			
2010	10	7.1			
2011	9	6.6			15.0
2013	8	6.7			
2014	9	6.5			

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# TICKLENAKED POND

Ryegate, VT

**Lay Monitors:** Peter and Mary Wood

**Former Lay Monitors:** Polly and Chuck Hebble  
Khristine Elder

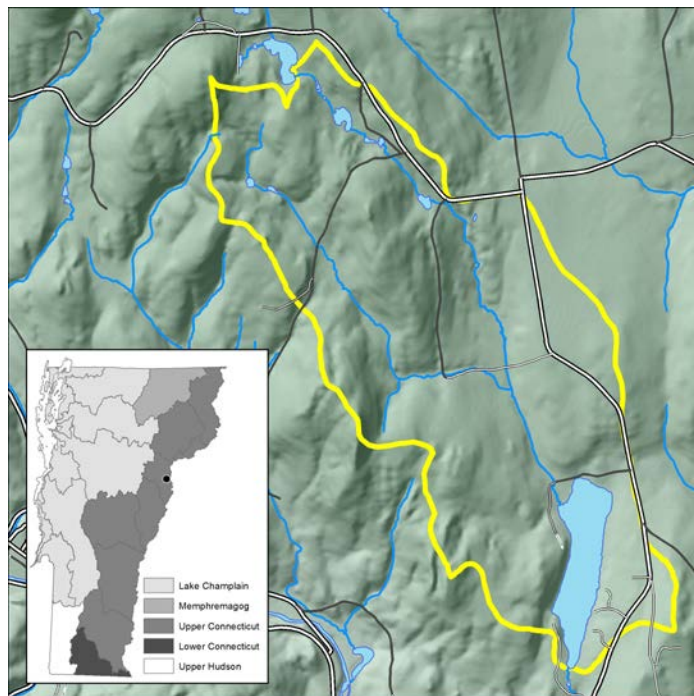
## Physical

Ticklenaked is a small, warmwater pond.

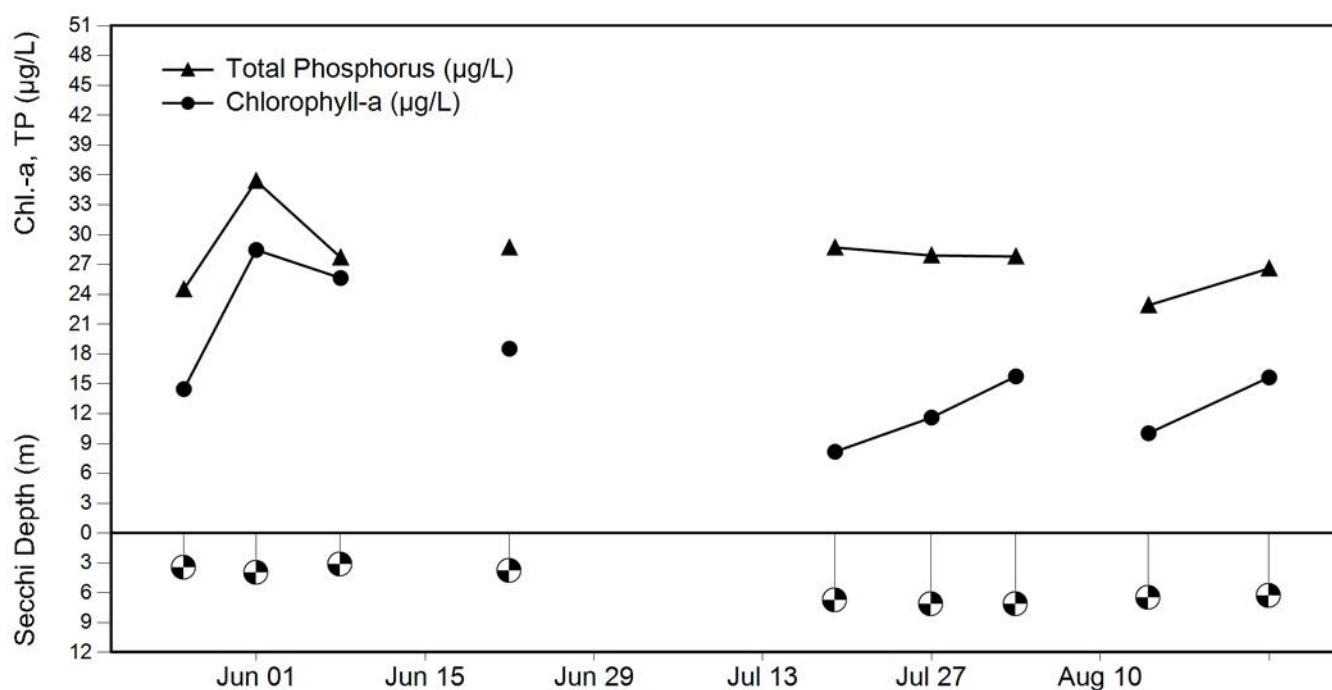
Lake Surface Area: 54 acres  
Drainage Basin Area: 1,444 acres  
Ratio (Basin:Lake): 27:1  
Maximum Depth: 51 ft (15.5 m)  
Mean Depth: 16 ft (4.9 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	2.2	4.2	7.2
Chl-a ( $\mu\text{g/L}$ )	9	8.0	16.5	29.8
Summer TP ( $\mu\text{g/L}$ )	9	22.9	27.8	35.4
Spring TP ( $\mu\text{g/L}$ )	1	59.3		



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# TICKLENAKED POND

## Annual Data

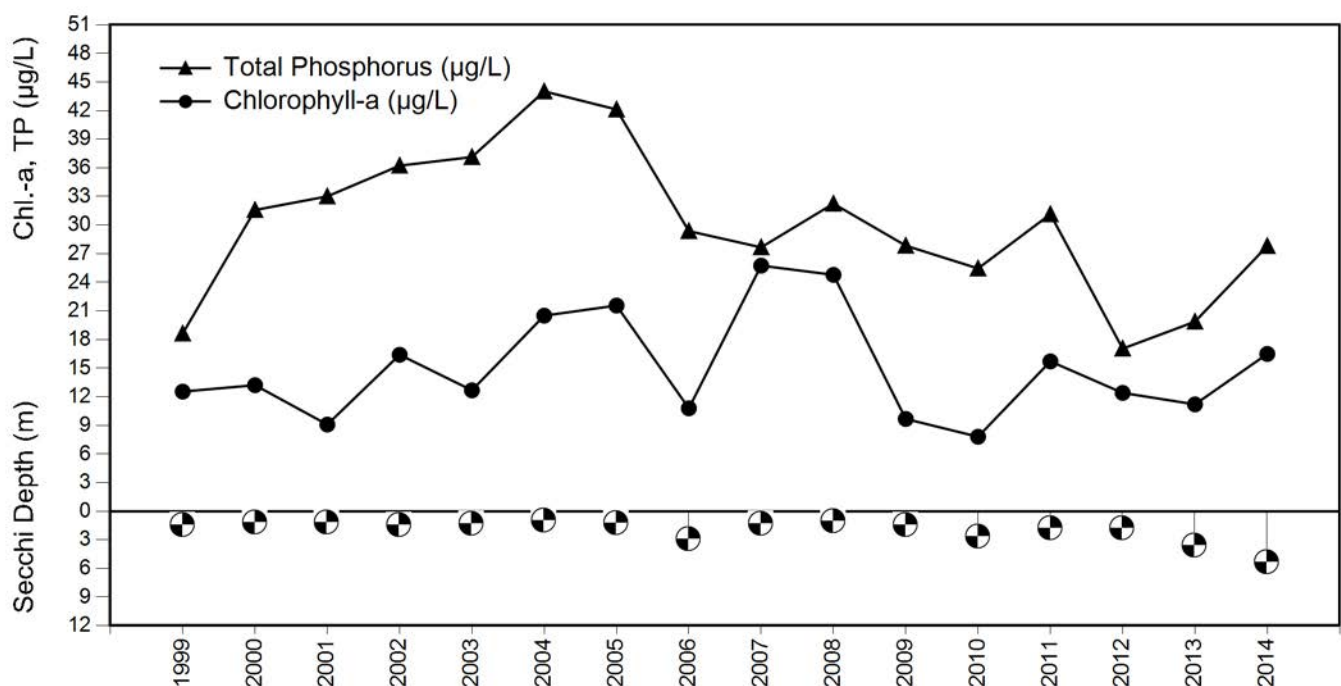
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1983					53.0
1981					59.0
1985					32.0
1987					37.0
1982					32.0
1984					43.0
1979					31.0
1986					26.0
1993					40.3

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1998					60.0
1999	8	1.5	12.5	18.6	55.7
2000	7	1.2	13.2	31.6	46.3
2001	9	1.2	9.1	33.0	122.0
2002	9	1.5	16.4	36.2	78.7
2003	9	1.3	12.7	37.1	55.3
2004	9	1.0	20.5	44.0	53.0
2005	9	1.3	21.6	42.1	91.3
2006	10	2.9	10.8	29.4	45.8
2007	9	1.3	25.7	27.7	45.0
2008	10	1.0	24.8	32.2	42.8
2009	10	1.5	9.7	27.8	46.8
2010	9	2.7	7.8	25.4	
2011	10	1.8	15.7	31.1	36.5
2012	8	1.8	12.4	17.0	72.4
2013	9	3.6	11.2	19.9	54.2
2014	9	5.4	16.5	27.8	59.3

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# VALLEY LAKE

Woodbury, VT

**Lay Monitors:** Dave & Meg Bawtinheimer

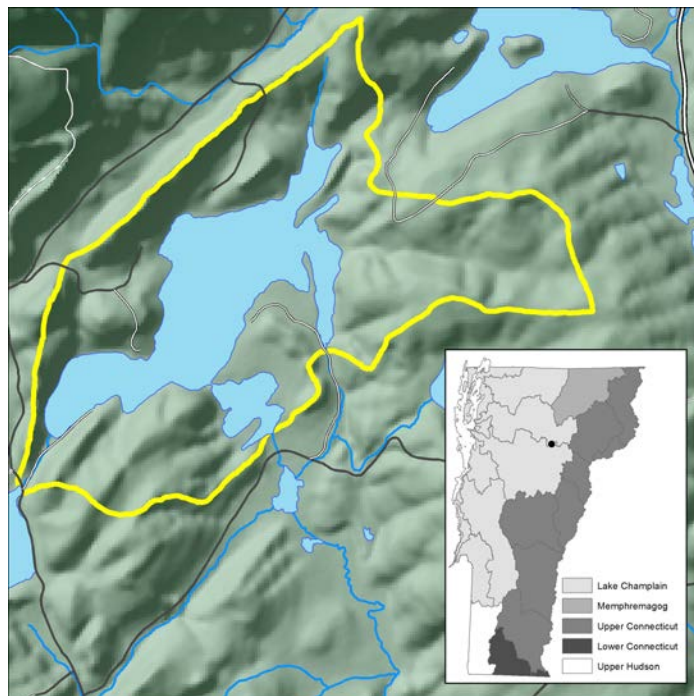
**Former Lay Monitors:** Arthur Orlandi  
Susan Jennings  
Douglas McConnell  
Nelson & Gene Perry

## Physical

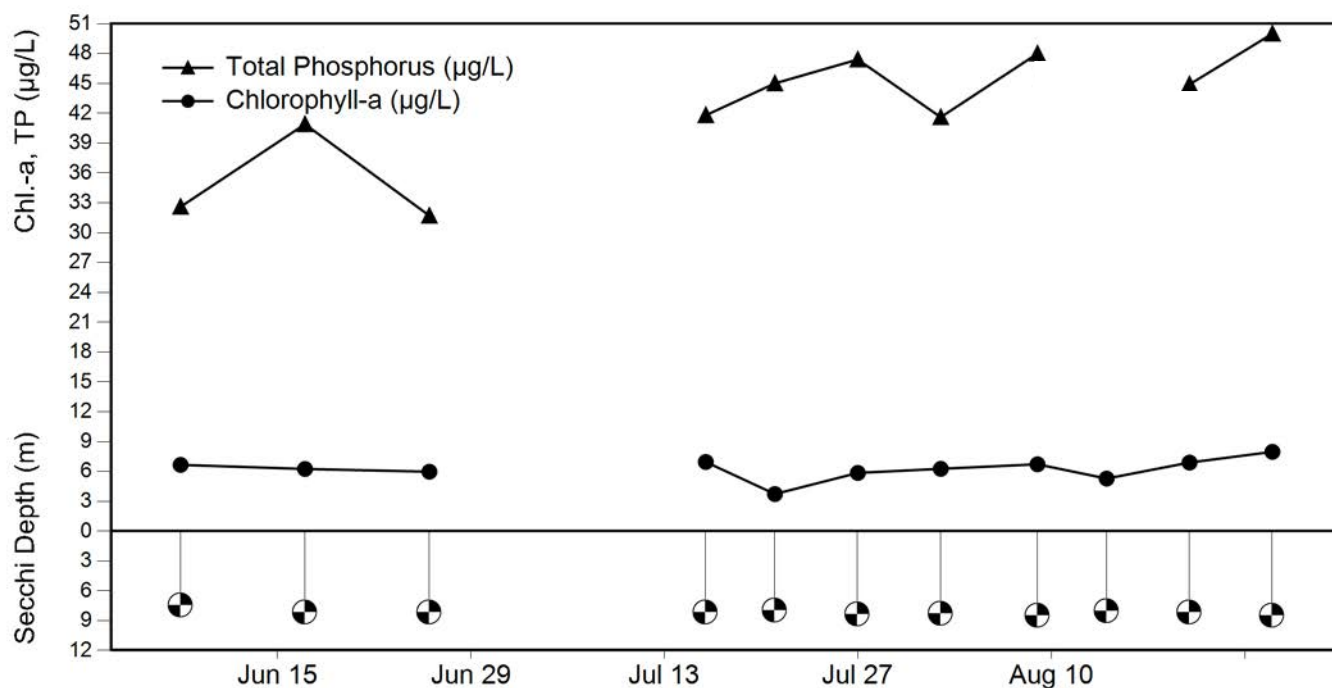
Lake Surface Area: 88 acres  
Drainage Basin Area: 472 acres  
Ratio (Basin:Lake): 5:1  
Maximum Depth: 70 ft (21.3 m)  
Mean Depth: 24 ft (7.3 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	11	6.5	8.0	8.5
Chl-a ( $\mu\text{g/L}$ )	11	2.5	6.2	8.5
Summer TP ( $\mu\text{g/L}$ )	10	31.7	38.5	50.0



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# VALLEY LAKE

## Annual Data

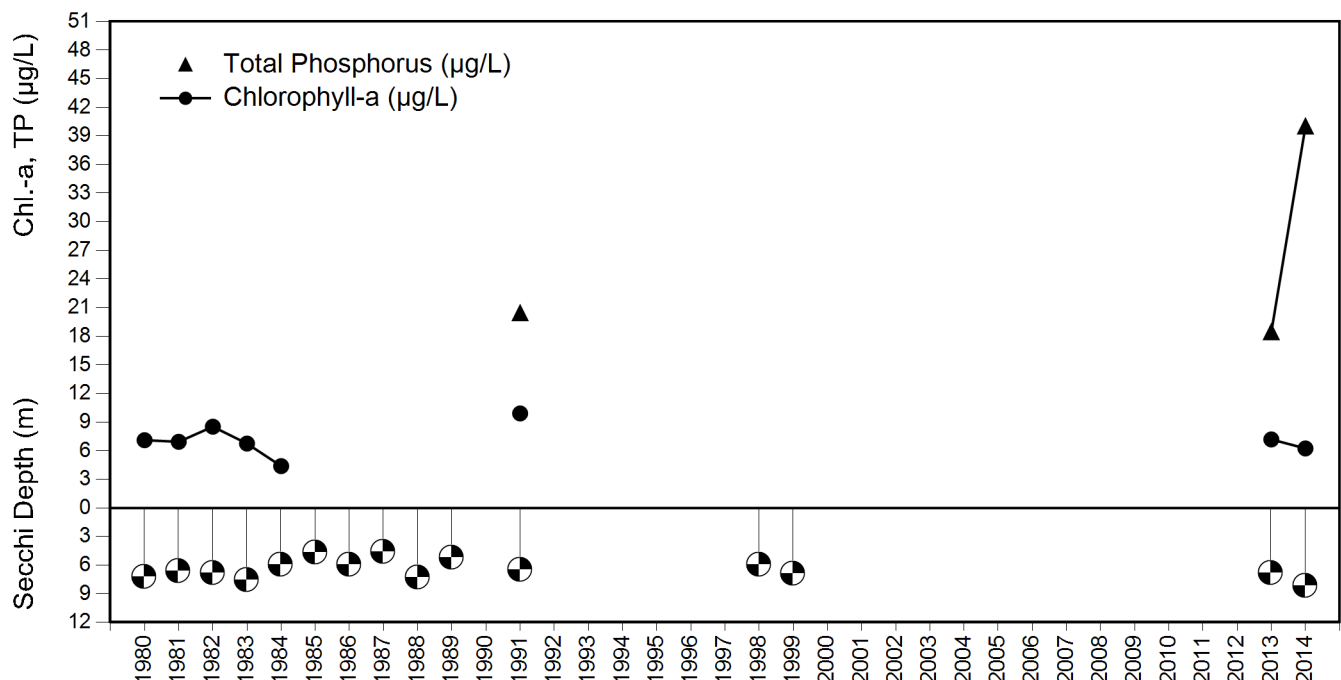
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1980	11	7.2	7.1		
1981	11	6.7	6.9		32.0
1982	13	6.8	8.5		27.0
1983	12	7.6	6.7		
1984	13	6.0	4.4		
1985	8	4.7			124.0
1986	9	6.0			
1987	7	4.6			
1988	9	7.3			
1989	11	5.3			
1991	6	6.5	9.9	20.4	
1993					40.0
1979					46.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1998	6	6.0			
1999	12	6.9			
2000					14.0
2004					24.3
2007					24.6
2010					23.1
2011					22.4
2013	10	6.8	7.2	18.4	
2014	11	8.2	6.2	40.0	

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# LAKE WILLOUGHBY

Westmore, VT

**Lay Monitor:** John Alexander  
**Former Lay** Ethan Swift  
**Monitors:** Roy Hill

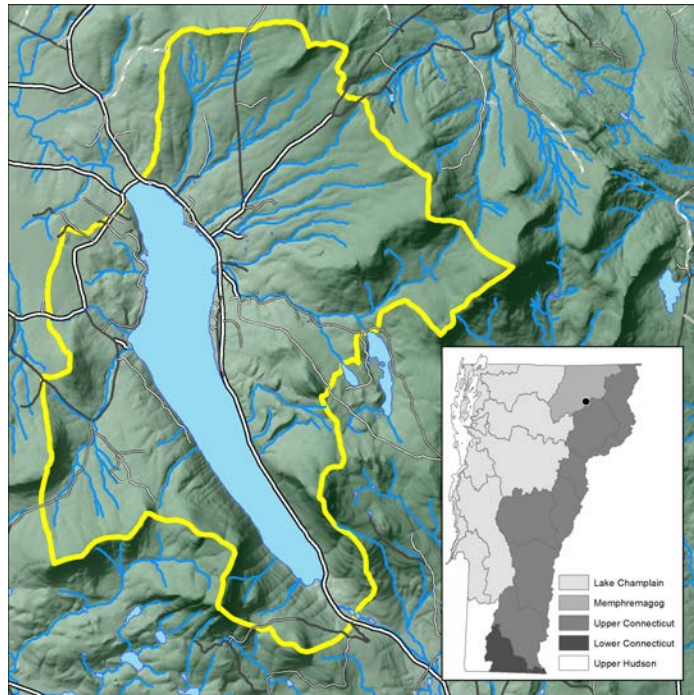
## Physical

Lake Willoughby is a large, deep, cold water lake.

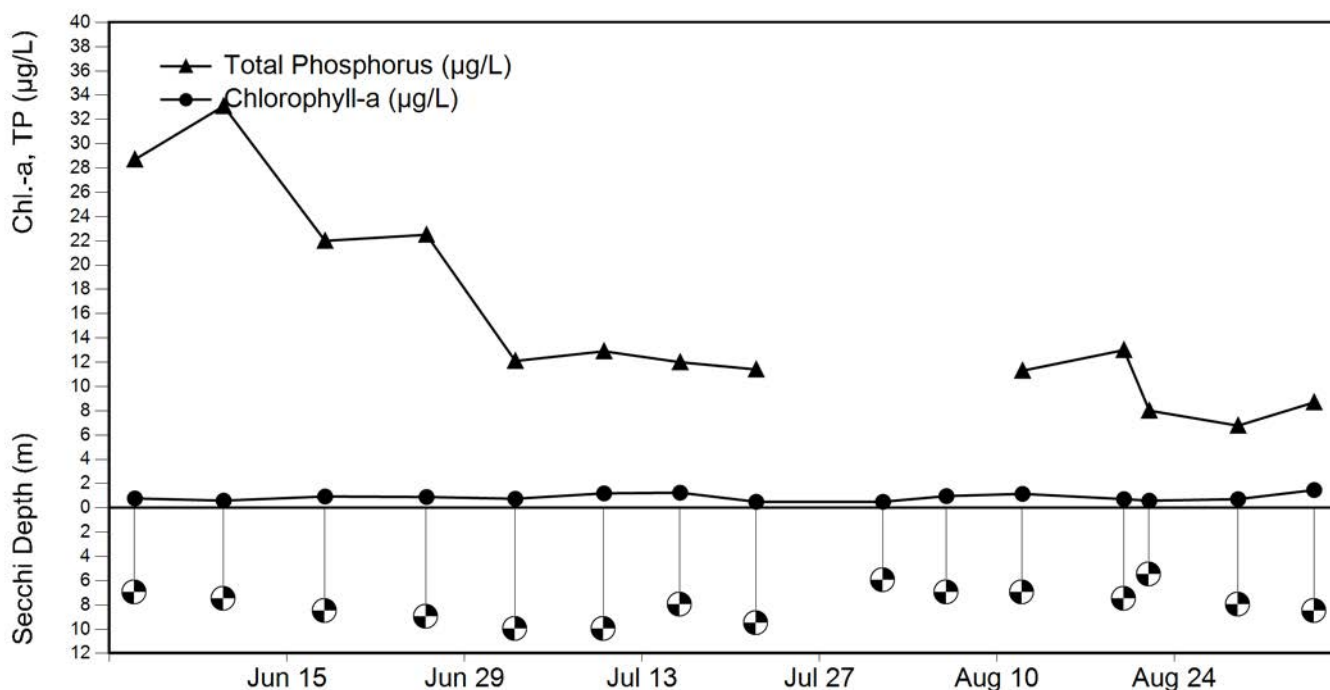
Lake Surface Area: 1,687 acres  
 Drainage Basin Area: 12,256 acres  
 Ratio (Basin:Lake): 7:1  
 Maximum Depth: 308 ft (93.9 m)  
 Mean Depth: 140 ft (42.7 m)

## 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	15	5.5	7.9	11.0
Chl-a ( $\mu\text{g/L}$ )	15	0.5	0.9	1.6
Summer TP ( $\mu\text{g/L}$ )	13	6.8	15.6	33.1
Spring TP ( $\mu\text{g/L}$ )	1		7.9	



## 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth





# LAKE WILLOUGHBY

## Annual Data

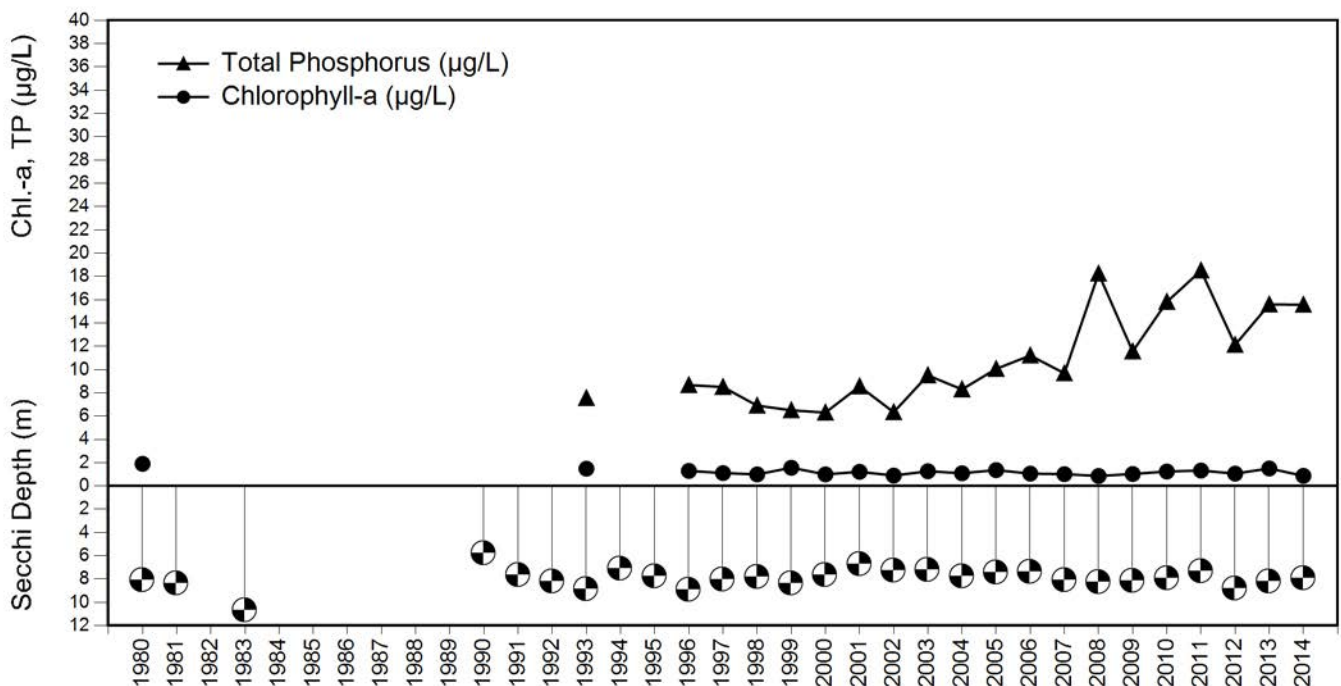
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1980	13	8.1	1.9		4.0
1981	11	8.4			4.0
1983	11	10.7			4.0
1990	10	5.8			
1991	12	7.6			
1992	13	8.2			5.0
1993	12	8.9	1.5	7.5	
1994	12	7.1			
1995	12	7.8			
1996	15	8.9	1.3	8.7	
1986					6.0
1987					6.0
1985					6.0
1984					5.0
1982					5.0

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1997	16	8.1	1.1	8.5	4.0
1998	18	7.8	1.0	6.9	3.7
1999	10	8.4	1.6	6.5	
2000	10	7.7	1.0	6.3	
2001	9	6.8	1.2	8.6	
2002	11	7.3	0.9	6.3	
2003	10	7.3	1.3	9.5	5.0
2004	15	7.8	1.1	8.3	5.7
2005	12	7.5	1.4	10.1	
2006	10	7.4	1.1	11.2	6.8
2007	13	8.1	1.0	9.7	9.1
2008	11	8.3	0.9	18.2	6.4
2009	13	8.2	1.0	11.6	6.5
2010	14	8.0	1.2	15.8	5.1
2011	13	7.3	1.3	18.5	
2012	13	8.8	1.1	12.1	5.3
2013	11	8.2	1.5	15.6	
2014	15	7.9	0.9	15.6	7.9

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# WOODBURY LAKE

## Woodbury, VT

**Lay Monitor:** Bob Martin  
**Former Lay Monitor:** Sheila Mattson

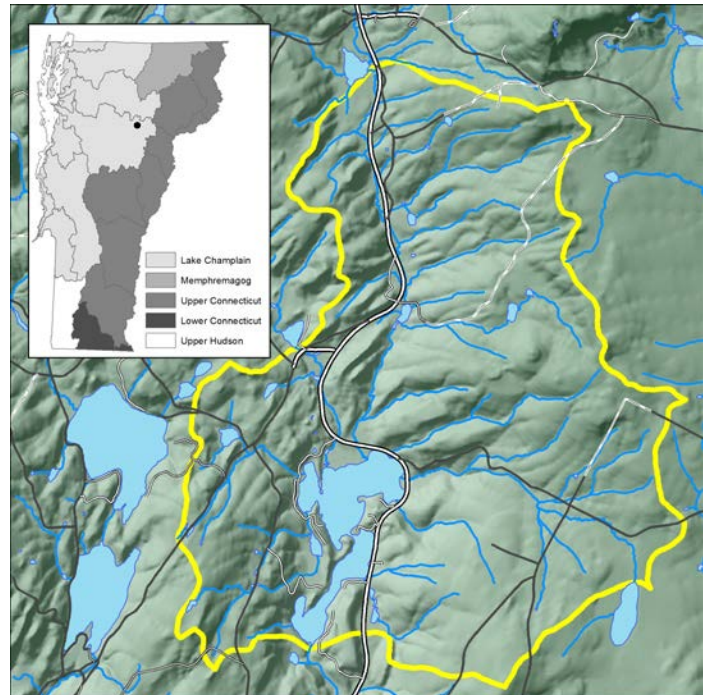
### Physical

Woodbury Lake is a moderately sized, warmwater lake composed of three basins separated by shallow channels. It is also called Sabin Pond.

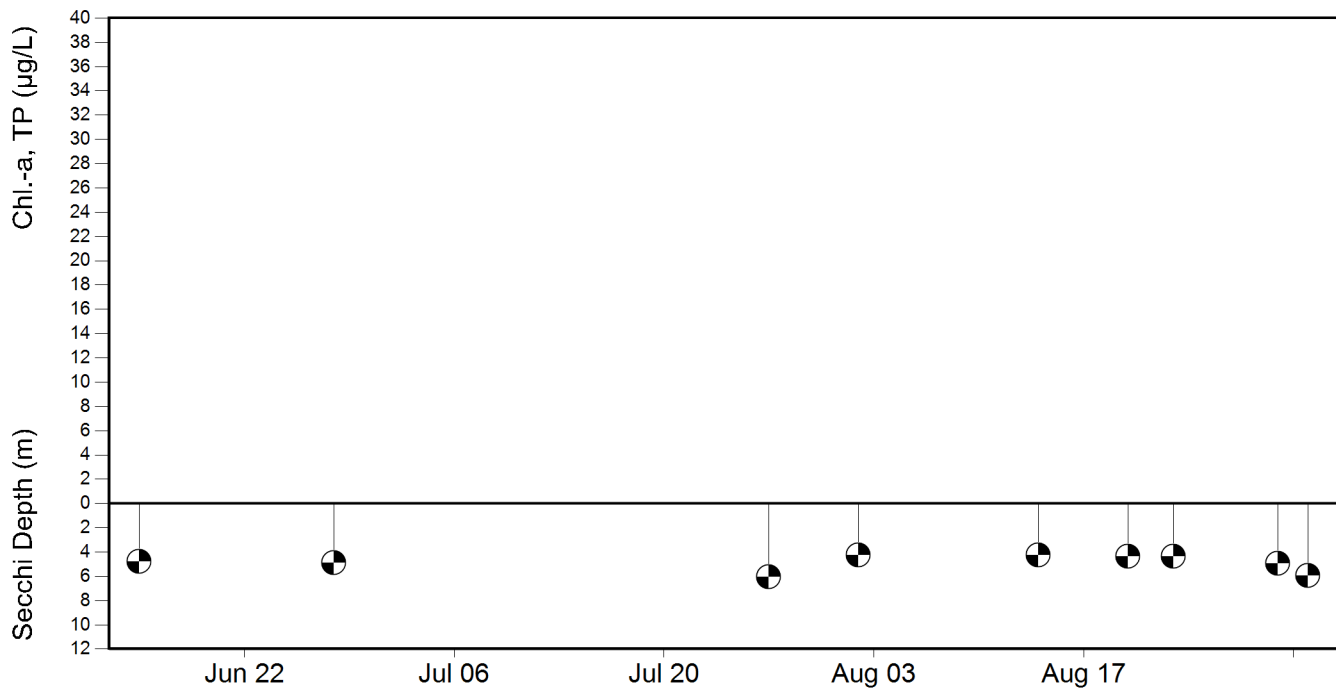
Lake Surface Area: 142 acres  
 Drainage Basin Area: 9,014 acres  
 Ratio (Basin:Lake): 64:1  
 Maximum Depth: 58 ft (17.7 m)  
 Mean Depth: 18 ft (5.5 m)

### 2014 Summary

Parameter	Days	Min	Mean	Max
Secchi (m)	9	3.7	4.8	6.1



### 2014 Daily Values: Total Phosphorus, Chlorophyll-a, and Secchi Depth



# WOODBURY LAKE

## Annual Data

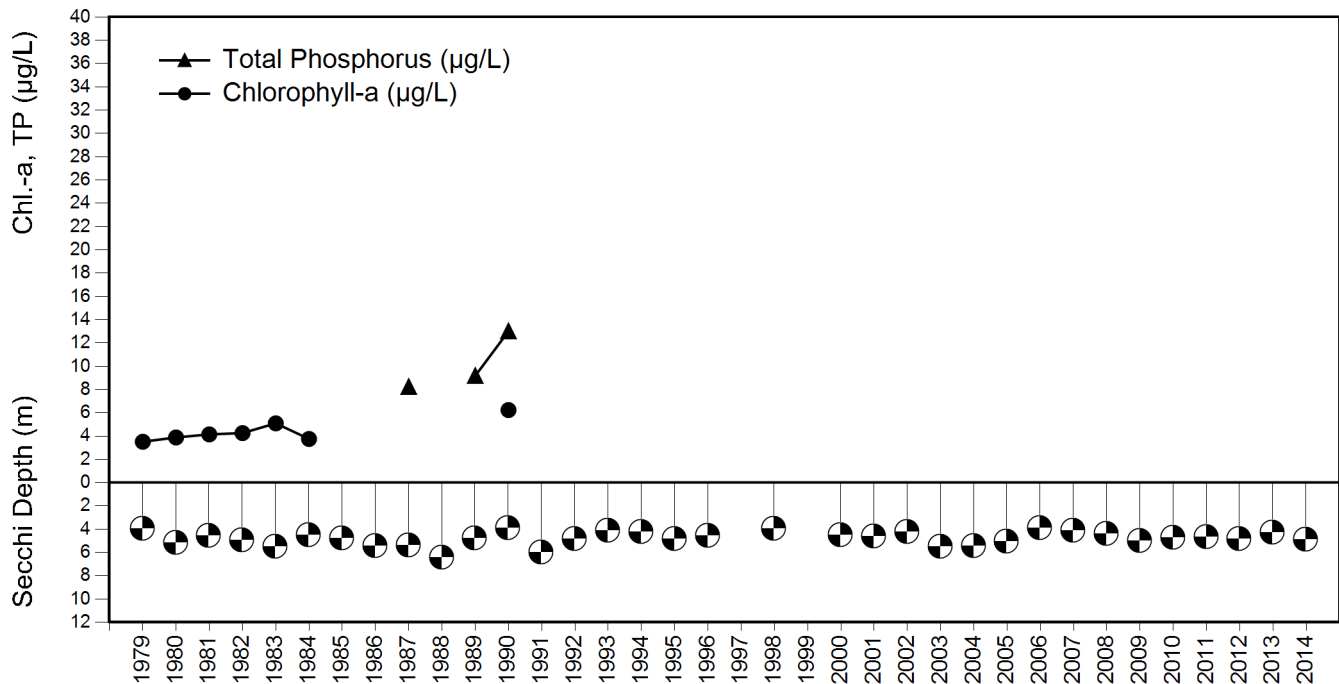
Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1979	16	4.0	3.5		5.0
1980	11	5.2	3.9		7.0
1981	8	4.6	4.1		8.0
1982	10	5.0	4.3		7.0
1983	9	5.5	5.1		9.0
1984	9	4.6	3.8		7.0
1985	3	4.8			8.0
1986	6	5.5			8.0
1987	10	5.4		8.2	10.0
1988	6	6.5			
1989	7	4.8		9.2	
1990	10	4.0	6.2	13.0	
1991	10	6.0			
1992	11	4.9			
1993	10	4.1			
1994	9	4.3			
1995	10	4.9			
1996	9	4.6			10.4

## Annual Data

Year	Days Sampled	Secchi (m)	Chloro-a (µg/l)	Summer TP (µg/l)	Spring TP (µg/l)
1998	8	4.0			
2000	10	4.5			
2001	9	4.6			
2002	10	4.3			10.3
2003	11	5.5			
2004	9	5.5			10.0
2005	10	5.1			9.8
2006	11	3.9			13.2
2007	10	4.2			12.0
2008	9	4.4			11.3
2009	8	5.0			11.1
2010	11	4.7			10.1
2011	12	4.7			
2012	10	4.8			9.2
2013	11	4.3			
2014	9	4.9			

Trophic State	Mean Secchi Clarity (m)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (µg/L)
Oligotrophic	> 5.5	< 3.5	< 7.0
Mesotrophic	3.0 - 5.5	3.5 - 7.0	7.0 - 14
Eutrophic	< 3.0	> 7.0	>14

## Summer Annual Means: Total Phosphorus, Chlorophyll-a, and Secchi Depth



APPENDIX A - LMP Participation - 1979-2014

<b>Lake Champlain Stations</b>	<b>1979</b>	<b>1980</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>
<b>#1 - Whitehall</b>	S	S	S	S	-	-	-	-	SP	SP	S	-	S	S	-
<b>#2 - Larrabee's Point</b>	S	S	S	S	S	S	S	S	S	S	S	SP	S	S	S
<b>#3 - Crown Point</b>	S	S	S	S	S	S	-	-	-	S	S	-	S	SP	SP
<b>#4 - Button Bay-Broad Lake</b>	-	S	-	-	S	SP	S	S	S	S	S	S	S	S	S
<b>#5 - Thompson's Point</b>	S	S	S	S	S	S	SP	-	SP	S	-	-	S	S	-
<b>#6 - Shelburne Bay</b>	S	S	S	S	-	-	S	S	SP	S	S	S	S	S	S
<b>#7 - Burlington-Broad Lake</b>	S	S	S	S	-	S	SP	-	S	S	-	SP	S	S	-
<b>#8 - Willsboro Point</b>	S	S	S	S	S	SP	S	S	S	S	S	S	S	-	-
<b>#9 - Colchester Shoals</b>	SP	-	S	-	SP	-	S	-	-	SP	-	-	-	S	-
<b>#10 - Outer Malletts Bay</b>	S	S	S	-	-	S	S	-	SP	-	SP	SP	S	S	S
<b>#11 - Inner Malletts Bay</b>	S	S	S	-	S	S	S	-	S	S	S	S	S	S	S
<b>#12 - Fish Bladder Island</b>	B	B	-	-	S	SP	SP	-	SP	-	-	S	S	S	S
<b>#13 - Cumberland Bay</b>	-	SP	-	SP	-	S	S	S	SP	SP	-	-	-	-	SP
<b>#14 - Treadwell Bay-Broad Lake</b>	S	S	S	S	S	S	S	-	SP	SP	-	-	-	-	S
<b>#15 - The Gut</b>	B	B	B	S	S	S	S	S	S	S	S	S	S	S	S
<b>#16 - Ball Island</b>	BP	S	S	-	S	S	S	S	SP	-	-	SP	SP	SP	SP
<b>#17 - St. Albans Bay</b>	S	S	S	S	S	S	S	S	S	S	S	S	S	SP	S
<b>#18 - Butler Island</b>	S	S	S	S	S	S	S	S	S	S	-	S	S	S	S
<b>#19 - Point Au Fer</b>	S	S	S	S	S	S	S	S	S	-	-	S	S	S	S
<b>#20 - Missisquoi Bay</b>	S	-	S	-	S	S	SP	-	S	S	S	S	S	S	S
<b>#21 - Keeler Bay</b>	B	B	BP	B	B	B	S	S	S	S	S	S	SP	S	S
<b>#22 - Maquam Bay</b>	-	-	B	B	BP	BP	BP	-	BP	BP	-	SP	S	SP	S
<b>#23 - Alburg Passage</b>	-	-	-	BP	-	-	S	S	S	S	S	S	S	S	-
<b>#24 - Inner Missisquoi Bay</b>	-	-	-	S	SP	SP	S	S	-	-	-	-	SP	S	S
<b>#25 - Pelots Point</b>	-	-	-	S	SP	-	S	S	-	-	-	-	-	-	-
<b>#26 - Kellogg Bay</b>	-	-	-	S	S	S	SP	-	S	-	S	SP	S	S	-
<b>#29 - Carry Bay</b>	-	-	-	S	S	-	S	S	S	S	S	S	SP	-	S
<b>#30 - Alburg Bridge</b>	-	-	-	-	S	S	SP	S	S	S	S	S	S	S	S
<b>#31 - Sandbar</b>	-	-	-	-	-	-	-	-	-	-	-	S	S	S	S
<b>#32 - Valcour Island</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	S	S

B = basic monitoring, Secchi water clarity only; S = supplemental monitoring - Secchi water clarity, total phosphorus and chlorophyll-a; P = partial data

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	S	S	S	S	S	S	S	S	S	S	S	S	-	S	S	S	SP	SP	SP	SP
S	S	S	S	S	-	-	-	-	-	-	-	S	S	S	S	S	SP	-	-	-
S	S	S	S	S	S	S	S	S	S	S	S	S	S	SP	S	S	S	S	S	B
-	S	S	S	SP	S	S	S	S	S	SP	S	S	S	S	S	S	S	S	S	-
S	S	S	S	S	-	S	S	S	S	S	S	S	S	S	S	S	S	S	-	-
S	S	SP	S	S	-	SP	S	S	-	S	S	S	S	S	S	S	S	S	S	BP
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	SP	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	B
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
S	S	-	-	S	S	S	S	S	S	S	S	SP	S	SP	S	S	S	-	-	-
SP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	S	S	-	-	-	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	S	-	-	-	-	-	-	-	-	-	-	S	S	S	S	S	S	SP	SP	-
-	SP	-	-	-	-	SP	S	SP	SP	SP	SP	S	-	S	S	S	S	-	-	-
S	S	S	S	S	-	S	S	S	S	SP	SP	-	-	S	S	S	S	-	-	-
S	SP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-
SP	S	SP	S	S	S	SP	S	S	S	S	-	S	S	-	S	S	-	S	-	-
S	S	S	S	S	S	S	S	S	S	S	S	S	-	S	S	SP	S	S	S	-
S	-	S	S	S	SP	-	-	-	-	-	-	-	-	-	-	-	-	-	S	S
S	S	S	S	S	S	S	S	S	-	-	-	-	-	S	S	S	S	-	-	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	S	SP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	-	-	-	-	-	-	-	-	S	S	-	-	S	-	S	S	S	S	S	-
S	S	S	S	S	S	S	S	S	SP	S	S	S	-	S	S	SP	S	S	S	S
S	S	-	-	S	S	S	SP	S	S	S	S	SP	S	SP	-	S	S	-	-	-
SP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

B = basic monitoring, Secchi water clarity only; S = supplemental monitoring - Secchi water clarity, total phosphorus and chlorophyll-a; P = partial data



<b>Lake Champlain Stations</b>	<b>1979</b>	<b>1980</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>
#33 - Burlington Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	S	S
#34 - Potash Point	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-
#36 - West Haven	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S
#37 - Outer Carry Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#38 - Town Farm Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#39 - Inner Thompson point	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#40 - North Beach	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#41 - Queneska Island	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
#42 - Champlain Bridge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

<b>Lake</b>	<b>1979</b>	<b>1980</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>
Amherst	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arrowhead Mountain	-	S	S	S	S	S	S	S	S	S	S	-	-	-	-
Beebe	S	S	S	S	S	S	B	B	BP	B	BP	BP	BP	B	B
Bliss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bomoseen	S	S	B	B	B	B	B	B	B	B	B	B	B	B	B
Buck	-	-	-	-	-	-	-	-	-	-	-	S	S	SP	-
Burr	BP	B	B	B	S	S	S	S	S	-	-	-	-	-	-
Carmi	S	S	S	SP	S	S	S	S	S	S	S	S	S	S	S
Caspian	BP	S	S	S	S	S	S	S	-	-	-	-	B	B	B
Cedar (Monkton)	-	-	-	-	-	-	-	-	-	-	-	S	SP	S	S
Chipman	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colchester	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cole	-	S	S	S	S	-	S	-	-	S	S	S	S	B	S
Coles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crystal	-	-	-	-	S	S	S	S	S	S	-	-	-	-	-
Curtis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Danby	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S
Derby	-	-	-	S	S	S	S	S	-	-	-	-	-	-	-
Dunmore	B	B	-	S	-	S	S	S	S	-	-	-	-	-	B
East Long	-	-	-	-	-	-	-	-	-	-	-	S	S	S	S
Echo (Charleston)	B	S	S	B	S	S	S	S	-	-	-	-	-	-	-
Echo	-	-	-	-	-	-	-	-	-	-	S	S	BP	BP	-
Eden	-	-	-	-	-	-	-	-	-	-	S	SP	S	S	S
Elfin	-	-	-	-	B	S	S	S	S	S	B	BP	B	B	B

B = basic monitoring, Secchi water clarity only; S = supplemental monitoring - Secchi water clarity, total phosphorus and chlorophyll-a; P = partial data

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
SP	S	S	SP	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	-	SP	SP	-	-	-	-	-	-	-	-	-	-	-	-
S	S	-	S	S	-	-	-	-	S	-	-	-	-	-	S	-	-	-	-	-
-	-	-	-	-	-	-	-	-	S	S	-	-	S	S	S	S	S	S	S	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	S	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SP	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-

1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SP	SP
-	-	-	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	B	B	B	BP	B	B	B	B	B	B	B	B	B	BP	B	B	B	B	B	B
-	-	-	B	B	S	S	S	S	S	S	-	-	-	-	-	-	-	-	-	-
B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
SP	SP	BP	-	BP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	-	S	S	SP	-	-	-	-	-	-	-	-	-	-	-
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	S	S	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
S	S	S	S	S	S	S	S	S	S	S	S	S	S	-	-	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B	B	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S	SP	S	S	S
S	S	B	B	B	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S
-	-	-	-	-	-	-	-	-	-	B	S	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	S	S	S	SP	B	B	B	B	-	B	B	S	S	S	S	S	S	S	S	S
B	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

B = basic monitoring, Secchi water clarity only; S = supplemental monitoring - Secchi water clarity, total phosphorus and chlorophyll-a; P = partial data

<b>Lake</b>	<b>1979</b>	<b>1980</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>
Eligo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Elmore	S	S	SP	S	S	S	S	B	B	-	-	-	-	-	-
Fairfield	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Fairlee	S	S	S	S	S	S	S	B	B	B	B	B	B	B	B
Fern	-	-	-	BP	S	-	-	-	-	-	-	-	SP	B	B
Forest (Nelson)	BP	BP	-	-	-	-	-	-	-	-	-	S	SP	S	-
Fosters	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glen	-	-	-	B	B	BP	B	B	B	-	-	-	-	-	-
Great Averill	B	B	B	-	-	-	-	-	-	-	S	S	SP	B	S
Great Hosmer	-	-	-	-	-	S	S	S	S	S	B	B	B	B	BP
Green River Reservoir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Greenwood	B	-	-	-	-	-	-	-	-	-	-	S	SP	SP	SP
Groton	BP	B	B	S	SP	S	S	S	S	S	-	-	-	-	-
Halls	B	S	S	S	S	S	S	B	S	S	S	S	S	B	B
Harvey's	S	S	S	S	S	S	SP	S	SP	-	-	-	B	B	B
Holland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hortonia	S	S	S	S	S	S	B	-	B	B	B	B	BP	B	B
Indian Brook Reservoir	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iroquois	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Island Pond	BP	S	S	S	S	S	S	B	B	B	B	B	-	B	B
Joes	B	BP	SP	B	SP	S	S	S	S	S	BP	-	-	-	B
Little															
Long	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lowell	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lower	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lyford	-	-	-	-	S	S	S	S	S	-	-	-	-	-	-
Maidstone	B	B	B	-	-	-	-	-	-	-	S	S	S	S	S
Martins	-	SP	S	S	S	SP	S	SP	-	-	-	-	-	-	-
Memphremagog	-	-	-	-	-	-	S	S	S	S	S	S	S	-	S
Memph. South Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metcalf	-	-	S	S	S	S	S	S	-	-	-	-	-	-	-
Miles	-	-	-	-	-	-	S	S	S	S	SP	SP	SP	BP	B
Mirror	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Morey	S	S	S	S	SP	S	S	S	S	S	S	S	S	SP	S
Newark	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nichols	-	-	-	-	-	-	-	-	-	-	-	S	S	-	S
Ninevah	-	-	S	SP	SP	S	S	S	S	B	BP	B	B	B	-
North Montpelier	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

B = basic monitoring, Secchi water clarity only; S = supplemental monitoring - Secchi water clarity, total phosphorus and chlorophyll-a; P = partial data

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
-	-	-	-	SP	S	S	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	S	S	S	-	-	-	-	-	-	-	-	-	-	-	-	-	S	SP	S	S
S	S	B	B	B	S	S	S	SP	S	S	-	-	S	S	S	S	S	-	S	S	SP
B	B	B	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
B	B	B	B	B	B	B	B	B	B	B	-	B	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	-
-	-	-	-	-	-	-	-	-	-	-	-	B	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	S	S	S	-	BP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BP	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
-	-	-	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	SP	S
SP	SP	-	-	-	-	-	-	-	-	-	-	-	-	S	S	S	S	-	-	-	-
-	-	-	-	-	-	B	B	B	B	B	B	S	S	S	S	-	S	S	S	BP	S
B	B	B	B	B	B	B	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S
B	B	B	B	S	S	S	S	SP	S	S	S	S	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	BP	B
B	B	B	B	B	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	S	S	S
S	S	S	B	B	B	B	B	B	B	B	B	B	-	B	S	S	S	S	S	S	S
B	B	B	B	-	-	-	BP	B	B	B	B	B	B	B	B	B	B	B	B	B	B
B	B	B	-	-	-	-	B	B	B	B	S	S	S	S	S	S	S	S	S	S	S
																	S	S	S	S	S
-	-	-	-	-	-	-	-	B	B	B	-	-	-	-	-	-	-	-	-	-	-
-	-	S	S	S	S	S	S	S	SP	SP	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	S	S	-	-	-	-
-	-	-	-	-	B	B	S	S	S	S	S	-	S	-	-	-	-	-	-	-	-
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	S	S	S	S	-	-	-	-	-	-	S	S	S	S	S	S	S	S	S	SP	-
-	-	-	-	-	-	-	-	-	-	-	-	S	SP	S	S	-	-	-	-	-	-
-	S	S	S	-	S	S	S	S	-	-	-	-	-	-	-	-	-	-	-	-	-
B	-	-	-	-	-	-	-	-	-	-	-	-	-	S	SP	S	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	B	S	-	-	-	-	-	-	S	S	S
S	S	S	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	-	-	S	-	-	-	-	-	-	-	-	-	-	S	S	S
S	S	S	-	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	S	S	S	S	S	-	-	-	S	S	S	S	S	S	S	S	S	S

B = basic monitoring, Secchi water clarity only; S = supplemental monitoring - Secchi water clarity, total phosphorus and chlorophyll-a; P = partial data

<b>Lake</b>	<b>1979</b>	<b>1980</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>
<b>Paran</b>	-	S	SP	S	SP	SP	SP	SP	S	S	S	-	B	B	B
<b>Parker</b>	S	S	S	S	S	S	S	S	S	S	S	S	S	B	S
<b>Peacham</b>	-	-	-	-	B	S	S	S	S	S	-	-	-	-	-
<b>Pensioner</b>	-	-	-	-	-	-	-	-	-	-	-	-	S	B	-
<b>Perch</b>	-	-	-	-	B	BP	-	S	S	S	S	-	-	-	-
<b>Pinneo</b>	-	-	-	SP	S	S	S	S	S	SP	B	B	BP	B	B
<b>Raponda</b>	-	S	S	S	S	S	-	-	-	-	-	-	B	-	-
<b>Rescue</b>	B	BP	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Runnemedede</b>	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-
<b>St. Catherine</b>	S	S	S	S	S	S	S	S	B	-	-	-	-	-	B
<b>Salem</b>	B	B	-	-	-	-	S	S	S	S	S	S	B	B	-
<b>Seymour</b>	S	S	S	S	S	S	S	B	B	B	B	B	B	B	B
<b>Shadow</b>	S	S	S	S	S	S	-	-	-	-	-	-	-	-	BP
<b>Shelburne</b>	-	-	-	-	-	-	-	S	S	S	S	S	S	-	-
<b>Silver</b>	-	-	-	-	B	S	S	S	S	S	S	S	SP	-	B
<b>South</b>	-	-	-	-	-	-	-	-	-	-	-	-	S	S	S
<b>Spring</b>	-	-	-	-	-	-	-	S	S	S	S	S	S	B	B
<b>Star</b>	S	SP	-	-	-	-	-	S	S	S	SP	-	-	-	BP
<b>Stratton</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Sunrise</b>	-	-	-	-	-	-	-	S	-	-	-	-	-	-	-
<b>Sunset (Benson)</b>	S	S	S	S	S	-	-	-	-	-	-	-	-	-	-
<b>Sunset (Brookfield)</b>	-	-	-	-	-	-	-	S	S	S	S	S	S	SP	B
<b>Ticklenaked</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Valley</b>	-	S	S	S	S	S	B	B	BP	B	B	-	SP	-	-
<b>Wapanacki</b>	-	-	-	-	S	S	S	S	S	S	B	B	-	-	-
<b>Willoughby</b>	-	S	S	-	S	S	S	S	B	BP	-	B	B	B	S
<b>Winona</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S
<b>Woodbury (Sabin)</b>	S	S	S	S	S	S	BP	BP	S	BP	SP	S	B	B	B
<b>Woodford (Big Pond)</b>	-	-	S	S	S	-	-	S	-	-	-	-	-	-	S
<b>Woodward</b>	-	-	S	SP	S	S	S	S	B	BP	BP	-	BP	-	B

B = basic monitoring, Secchi water clarity only; S = supplemental monitoring - Secchi water clarity, total phosphorus and chlorophyll-a; P = partial data



1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
B	B	-	-	-	-	-	-	-	-	-	S	SP	S	-	-	-	-	-	-	-	-
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	-	-	B	B	B	B	B	B	-	S	S	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	B	B	B	-	-	B	B	B	-	-	-	B	B	B	-	B	B
B	B	B	BP	B	BP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	S	S	S	S	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	B	S	S	S	S	S	S	S	S	S
-	-	-	-	-	SP	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
B	B	B	S	SP	S	S	S	S	S	S	S	B	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
B	S	S	S	B	B	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
BP	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B	BP	-	-	B	B	BP	BP	B	B	B	B	B	B	B	B	B	-	B	B	B	B
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
B	B	S	S	S	S	S	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BP	-	-	-	-	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	S	S	S	S	-	S	S	S	S	-	-	-	-	-	-	-	-
-	-	-	-	-	B	B	B	B	B	B	B	B	B	B	B	B	B	B	-	B	B
-	-	-	-	-	B	B	B	B	B	B	B	B	B	-	B	B	B	S	S	S	-
B	B	B	B	BP	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	-
-	-	-	-	-	-	S	SP	S	S	S	S	S	S	S	S	S	S	S	S	S	S
-	-	-	-	-	BP	B	-	-	-	-	-	-	-	-	-	-	-	-	-	S	S
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	B	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-	-
B	B	B	B	-	B	-	B	B	B	B	B	B	B	B	B	B	B	B	B	-	B
S	SP	S	SP	B	-	-	-	-	-	-	-	-	-	-	S	-	S	S	S	S	S
B	BP	-	BP	-	-	B	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-

B = basic monitoring, Secchi water clarity only; S = supplemental monitoring - Secchi water clarity, total phosphorus and chlorophyll-a; P = partial data

## APPENDIX B - Distinguished Service Awards - 2014

### **30 years**

Dick Harter, Lake Champlain

### **25 years**

Andy Dales, Caspian Lake

Bob Martin, Sabin Pond

### **20 years**

Mike Bird, Elfin

Michael Gray and Ellie Hayes, Nichols Pond

Steffen and Kathryn Parker, Lake Champlain

### **10 years**

Andrew Robbins, Runnemedede

Mary Jo Teetor, Lake St. Catherine and Little Lake

Laura Brown, North Montpelier Pond

David and Marilyn Magnus, Foster's Pond

### **5 years**

Peter Benevento, Lake Carmi

Maureen O'Neill, Big Pond

### **1 year**

Rich Dahlgren, Lake Dunmore

Barry Goldensohn, East Long Pond

John Hancock, Fairfield



## APPENDIX C - Lakes and Ponds Program Contacts

**Perry Thomas, Program Manager - (802) 490-6198, [perry.thomas@state.vt.us](mailto:perry.thomas@state.vt.us)**  
*Supervision and coordination of the Lakes & Ponds Management and Protection Program*

**Eric Smeltzer, Environmental Scientist - (802) 490-6131, [eric.smeltzer@state.vt.us](mailto:eric.smeltzer@state.vt.us)**  
*Scientific studies, monitoring, and policy analysis to support regulatory and management programs on Lake Champlain and other Vermont lakes.*

**Ann Bove, Environmental Scientist - (802) 490-6120, [ann.bove@state.vt.us](mailto:ann.bove@state.vt.us)**  
*Aquatic invasive species management, aquatic nuisance species grant program, and aquatic plant monitoring and identification.*

**Kevin Burke, Environmental Analyst - (802) 490-6165, [kevin.burke@state.vt.us](mailto:kevin.burke@state.vt.us)**  
*Regional Permit Analyst, providing technical assistance for the Lake Encroachment and Shoreland Permit Program.*

**Misha Cetner, Environmental Analyst - (802) 490-6199, [misha.cetner@state.vt.us](mailto:misha.cetner@state.vt.us)**  
*Regional Permit Analyst, providing technical assistance for the Lake Encroachment and Shoreland Permit Program.*

**Dan Homeier, Environmental Analyst - (802) 490-6200, [dan.homeier@state.vt.us](mailto:dan.homeier@state.vt.us)**  
*Regional Permit Analyst, providing technical assistance for the Lake Encroachment and Shoreland Permit Program.*

**Leslie Matthews, Environmental Scientist - (802) 490-6193, [leslie.matthews@state.vt.us](mailto:leslie.matthews@state.vt.us)**  
*Monitoring both trends and condition of inland lakes for compliance with the Clean Water Act and Vermont Water Quality Standards. Inland Lake water quality assessments, spring phosphorus sampling, and special studies like littoral habitat assessment.*

**Kellie Merrell, Environmental Scientist - (802) 490-6194, [kellie.merrell@state.vt.us](mailto:kellie.merrell@state.vt.us)**  
*Monitoring both trends and condition of inland lakes for compliance with the Clean Water Act and Vermont Water Quality Standards. Inland Lake water quality assessments, spring phosphorus sampling, and special studies like littoral habitat assessment.*

**Amy Picotte, Environmental Analyst - (802) 490-6128, [amy.picotte@state.vt.us](mailto:amy.picotte@state.vt.us)**  
*Shoreland Management and Lake Wise, Vermont Project WET (Water Education for Teachers)*

**Matthew Probasco, Environmental Scientist - (802) 490-6133, [matthew.probasco@state.vt.us](mailto:matthew.probasco@state.vt.us)**  
*Administers the Aquatic Nuisance Control Permit Program, the Pesticide General Permit, and the Rapid Response General Permit.*

**Bethany Sargent, Environmental Scientist - (802) 490-6129, [bethany.sargent@state.vt.us](mailto:bethany.sargent@state.vt.us)**  
*Vermont Lay Monitoring Program, Vermont Invasive Patrollers (aquatic invasive species early detection)*

**Angela Shambaugh, Aquatic Biologist - (802) 490-6130, [angela.shambaugh@state.vt.us](mailto:angela.shambaugh@state.vt.us)**  
*Lake Champlain water quality monitoring, zebra mussel monitoring, algae and cyanobacteria on Lake Champlain and selected inland waters.*

**Peter Stangel, Aquatic Biologist - (802) 490-6132, [pete.stangel@state.vt.us](mailto:pete.stangel@state.vt.us)**  
*Lake Champlain water quality monitoring, and zebra mussel monitoring on Lake Champlain and selected inland waters.*

## APPENDIX D - Glossary

**Algae:** Simple aquatic plants which are usually microscopic in size. Algae can grow suspended in the water or attached to plants or the lake bottom. Algae do not have true roots, flowers, and leaves.

**Anaerobic (also anoxic):** Environment in which oxygen is absent.

**Bacteria:** Microscopic single cell organisms that are similar to plants but lacking in chlorophyll.

**Bloom:** A very large algal population that may cause a green coloration of the water or form large floating mats. Such a large population may be stimulated by high nutrient levels, warm water temperatures and long periods of sunlight. Seasonal spring and fall algal blooms usually are part of the normal cycle of a productive lake.

**Chlorophyll:** The photosynthetic, green pigment contained in all green plants.

**Cultural eutrophication:** The acceleration by human activities of the natural aging process in a lake evidenced by increasing nutrient concentrations.

**Drainage basin (also watershed):** The land area draining into a body of water. The surface area of the lake is included in the calculation of the drainage basin surface area.

**Ecology:** The study of the relationships between organisms and their environment.

**Erosion:** The loosening and subsequent transport of soil away from its native site. In Vermont, erosion typically results from the removal of vegetation, which is a soil stabilizer.

**Eutrophic:** A general classification of lakes which have a high level of nutrients. Eutrophic lakes are often shallow, warm, seasonally deficient in oxygen in the lower depths of the lake, and supportive of large algal and/or aquatic plant populations.

**Euphotic zone:** The layer of lake water where light penetrates through the water and is useable by plants and algae.

**Eutrophication:** The natural aging process of a lake whereby nutrients and sediments increase in the lake over time, increasing its productivity and eventually turning it into a marsh. If the process is accelerated by human-made influences, it is referred to as "cultural eutrophication."

**Fecal coliform bacteria:** Bacteria found in the feces of warm-blooded animals. Fecal coliform bacteria are used as indicators of recent sewage contamination. Fecal coliform bacteria are not harmful themselves, rather they indicate the potential presence of other disease-causing organisms.



**Groundwater:** Water that lies beneath the earth's surface in water-filled layers of sand, gravel, clay or cracked rock.

**Lake basin:** A depression in the surface of the land that forms a lake when full of water. Lakes may be composed of more than one basin.

**Limiting nutrient:** The nutrient whose demand exceeds its supply such that growth is restricted until more is available.

**Limnology:** The study of the physical, biological, and chemical aspects of inland ponds (generally freshwater), lakes, and streams.

**Macrophytes:** Rooted aquatic plants which grow in or on the water. They have true roots, flowers, and leaves.

**Mean (also average):** Calculated by adding the values of all the data points and dividing this sum by the number of data points.

**Mesotrophic:** A general classification of lakes between the levels of oligotrophic and eutrophic. Mesotrophic lakes have a moderate level of nutrients and are somewhat productive (supportive of moderate growths of algae and aquatic plants).

**Meter:** A measure of length in the metric system, approximately equivalent to 3.25 feet. One meter (m) equals 39.37 inches or 1.0936 yards.

**Microgram ( $\mu\text{g}$ ):** The unit of measurement used to express one part per million (ppm).

**Nonpoint source pollution:** Pollution that comes from a diffuse area, as opposed to a discharge pipe, and that enters lakes or streams via runoff, groundwater, or tributary streams. Examples are soil erosion, septic system pollution, and manure runoff.

**Nutrient:** A chemical required for growth, development or maintenance by a plant or animal. Examples are nitrogen and phosphorus.

**Oligotrophic:** A general classification of lakes which have a low level of nutrients. Oligotrophic lakes are usually deep and cold. They usually have a sufficient amount of oxygen at all depths and they support little algal and aquatic plant growth.

**Organic compound:** A chemical compound containing carbon as the base element. Some kinds of organic compounds can be toxic to plant and animal life.

**Overturn:** The thorough mixing of the water in a lake during the spring and during the fall when the water is uniform in temperature and density.

**Phosphorus:** A nutrient required by plants, including algae, for growth. In lakes,

phosphorus is usually the nutrient in shortest supply relative to other nutrients. The addition of phosphorus to a lake will stimulate plant and algal growth.

Photosynthesis: Production of organic compounds using light by chlorophyll-containing cells.

Photic zone: The lighted region of a lake where photosynthesis takes place.

Phytoplankton: Small plants, usually microscopic, suspended in the water, that drift in the water with waves or currents.

Point source pollution: Pollution from discharge pipes or outfalls from sources, such as wastewater treatment plants or industrial facilities.

Riparian: A term used to describe the shoreland area of lakes, ponds and streams.

Secchi disk: A white and black disk 8 inches (20 cm) in diameter used to measure transparency of water.

Sediment: Bottom material in a lake that has been deposited after the formation of a lake basin. Sediment results from the accumulation of decomposing remains of aquatic organisms, chemical precipitation of dissolved minerals, and erosion of surrounding lands. Sediment particles may also be suspended in the water.

Sedimentation: The sinking of silt, algae, and other particles through the lake water column and their deposition on the lake bottom (where they form sediment). Sedimentation is an important process in the life of a lake, transferring nutrients throughout the lake's layers and providing a critical link between surface plankton and bottom-dwelling organisms.

**Stratification:** The formation of thermal zones in deep lakes during the summer. These zones are referred to as the epilimnion (warm upper region), hypolimnion (cold lower region), and metalimnion (thin boundary between the other two layers).

Trophic level: A relative level of productivity. Three trophic levels of Vermont lakes are eutrophic, mesotrophic and oligotrophic.

Turbidity: A measurement of water clarity. High turbidity (low water clarity) is caused by suspended particles such as silt, soil or algae which reduce light penetration.

Water table: The upper surface of groundwater below which the soil is saturated with water.

Watershed (also drainage basin): The land area draining into a body of water. The surface area of the lake is included in the calculation of the drainage basin surface area.

Wetland: An area that is inundated by surface or ground water with a frequency sufficient to support significant vegetation or aquatic life dependent on saturated or seasonally saturated soil conditions for growth and reproduction.

Zooplankton: Small aquatic animals, often microscopic in size and capable of mobility.



