REPORT ON THE LAKE GEORGE MONITORING PROGRAM
APRIL 1983 - NOVEMBER 1983

by

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Submitted to

The Lake George Association Fund

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FWI #84-1

REVISION TO LAKE GEORGE MONITORING PROGRAM

INTRODUCTION

During recent years a number of published reports and one internal review concerning the Lake George Coliform Monitoring have been completed. The reports of Bradley and Aulenbach (1983); Clifford (1982), Haas and Clifford (1981), and Kupar, (1982) were all statistical treatments of the data gathered by New York State Department of Environmental Conservation (NYS DEC) and New York State Department of Health (NYS DOH). A complete review of the coliform monitoring program carried out by NYS DEC Region 5 was done by Sutherland (1982). This report dealt with data from 1975-1981 and was the primary source of information used in developing this plan.

Since 1981 Rensselaer Fresh Water Institute (FWI) has done coliform monitoring on Lake George. The samples for bacteriological analyses were taken at the same locations as the samples for routine chemical analyses. At most sites the sampling location was to far from shore to accurately detect any point sources. Sampling at such a distance from shore has been a problem common to many coliform monitoring programs done on Lake George.

A short term survey by the consulting firm WAPORA was carried out during the Summer of 1981. The vague site descriptions in the report makes it of little use. Even though the reports of Bradley and Aulenbach (1983), Clifford, (1982), Haas and Clifford (1981), Kapur (1982), and Sutherland (1982) all demonstrate the overall high quality of Lake George water it is clear that serious problems do exist. A new program designed to analyze the whole lake situation by sampling in numerous locations is needed to clarify the overall picture. This is especially true now (in view of the fact that in 1983 the NYS DEC Region 5 was able to collect only 10 coliform samples every two weeks).

Along with increased number of sampling sites, accurate baseline values need to be established for the entire lake and for each individual site. To obtain a coliform baseline for each site, a sample will be taken in the spring prior to heavy summer usage. A weekly sample at Northwest Bay Brook gage house will be used as an overall lake baseline coliform count.

Reports of the data will be issued in a timely fashion (every 2 weeks) and distributed to the Lake George Association, NYS DEC Region 5, Bureau of Water Research and NYS DOH and will be available for distribution to other interested parties. An annual summary report will be prepared and distributed.

SAMPLING SITES AND PROTOCOL

The sites proposed for sampling by FWI during the Summer of 1984 are listed below.

These sites have been divided into 4 groups, each of which will require slightly different treatment.

Group A

Routine Monitoring Sites - These will be sampled the most frequently. Sites were selected based on those locations most often sampled by the NYS DEC (Sutherland, 1982) or due to characteristics that might lead to reduced water quality. The number in parenthesis is the number of samples taken at the site during the period of 1975-1981 (Sutherland, 1982).

Northwest Bay Brook has been chosen as the control or "normal background" site since the watershed of this brook is predominately forest with a very low human impact.

Dome Island will also be monitored as part of RPI FWI regular lake sampling program.

Group B

Each of these locations are general lake sites that have been chosen because they have certain special characteristics. The letters and/or numbers appearing in the table next to each site are the actual number of previous samplings (according to Sutherland, 1982) and the reasons for sampling.

The letter codes are as follows:

A. High population density

B. Poor soil condition

C. Proximity to semi public beaches

D. High intensity of use

E. Area undergoing large changes in use patterns.

Group C - Beach group

This group is composed solely of major public beaches on Lake George.

Group D - Stream Group

Major streams including those that drain heavily populated areas.

Group A

Routine Monitoring Sites

West Brook	(133)
Lake George (Sheriffs Dock Culvert)	(241)
Tahoe Culvert	(157)
Antler	(75)
Smith Brook	(205)
Sawmill Bay Stream (Ann's Bait Shop Stream)	(32)
Gull Bay	x Recent increase in number of complaints and increased population density.
Hague at boat launch	(73)
Blackpoint	x High population density on limited soils.

Northwest Bay Brook at Gage House — (64) will be considered as the normal background coliform site

x = unranked

Group B

General Lake Monitoring Sites

The information in parenthesis is the number of times previously sampled (Sutherland, 1982) or reason for sampling. A number of letter coordinate is from the emergency location map.

Town of Lake George

Tea Isl. Cove (B)

Cramer Pt. (A,B)

Bay a 46-N, (D)

Still Bay (A)

Orcutt Bay (A,D)

Diamond Pt. Bay (A,B,C,D)

Town of Queensbury

Plum Pt. (A)

Woods Pt. (A)

Dark Bay (A,B)

Dunham Bay (25)

Assembly Pt. (A)

Stream on Assembly Pt. (A)

Harris Bay at Yardarn (41)

Cleverdale (16)

Sandy Bay (30)

Sheldon Pt. (A)

Rockhurst (A)

Warners Bay (A,D)

Bay at 42-7 (A,D)

Town of Bolton Landing

Thunderbird Bay (A,C,D)

Boon Bay East and North (A,C,D)

N-Basin Bay (B)

Town of Fort Ann

Echo Bay (A,B,D)

Issom Bay

Barber Bay (D)

Mid Basin Bay (A,B,D)

South Basin Bay (B)

Three Brothers Isl. (A,B,D)

Huddle Bay (A,D)

Green Isl. (D,E)

Crown Isl. (D)

Pioneer Pt. (B,D)

YMCA Camp Bay (A)

Pilot Knob (B,C,D)

__Town of Dresden__

Kitchal Bay (A,B,D)

Cook Bay (D)

Indian Bay (D)

__Town of Hague__

Sabbath Day Pt. (A)

Bass Bay (A)

Silver Bay (C,D)

VanBuren Bay (C,D)

Arcady Bay (C,D)

Island Harbor (B,D)

Forest Bay (B,D)

Cooke Bay (B,C,D)

__Narrows Island Series__

Red Rock Bay (B,D)

Turtle Isl. (B,D)

Juanita (B,D)

Big Burnt (B,D)

Little Harbor (B,D)

Fork Isl. (B,D)

Dollar Island

Mother Bunch

__Town of Putnam__

Lamb Shanty Bay (B)

Clark Hollow Bay (E)

Smith Bay (D,E)

Dark Bay (E)

Glenburnie (D,E)

Town of Ticonderoga

Hearts Bay (D)

Weeds Bay (D)

Spencer Pt. (D)

Mossy Pt. (D)

Group C Beaches	Group D Streams
Million Dollar Beach	East Brook
Shepard Park	Finkle Brook
Hearth Stone State Campsite	Huddle Brook
Veteran Park-Bolton	Assembly Pt. Stream
Rogers Memorial-Bolton	Edmund Brook
Washington Co. Beach	Indian Brook
Town of Putnam Gull Bay	Pole Hill Pond Brook
Hague at boat launch	Eichlerville Stream
Roger Rock State Campsite	Mud Pond Brook (Gull Bay)
Ticonderoga at Black Pt.	Sucker Brook (Glenburnie)
	Hague Brook

The list was assembled from the following sources:

Kapur R. Lake George Bacteriological Water Quality, The Lake George Ecosystem.

Sutherland J. An evaluation of the Lake George Surface Water Bacteriological Monitoring Program. Internal.

WORK PLAN

	Number of Spring samplings*	Number of Summer samplings
Group A	3	9
Group B	1	1
Group C Beach Sites	1	2
Group D Streams	1	2

Spring samples to be taken from Mid-May to the 3rd week of June.

Summer samples July to the 1st week of September.

Twenty samples will be taken each week. In the spring 5 of the twenty samples will be from Group A with the balance from Groups B, C, & D. In Summer sampling trips will again be composed of twenty samples, with 10 from Group A and the balance from Groups B, C, or D. Bacterial analyses will be done on surface water samples and include the following: total coliform, fecal coliform, and fecal streptococcus using the membrane filtration technique (Standard Methods 15th ed. Sect. 909, 910B). Samples will be taken during dry weather whenever possible.

The pH and conductivity will be measured on all samples. If the conductivity of the sample exceeds 120 umohns an aliquot of the sample will be retained for analyses for nitrate, ammonia, chloride and total phosphorus.

Each week two duplicate samples will be submitted to the Queensbury Water Treatment Laboratory. Group B sites showing signs of high fecal coliform contamination (fecal coliform plate counts greater 100 colonies/100 ml) will be resampled within two days of initial sampling and if the site still has high levels of fecal coliforms on the second sampling it will be reported to the appropriate agency. If an intermediate level of 50 or more colonies/100 ml is found, then the site will be resampled the following week. The site listed in the text is the general area to be sampled with the actual sampling location determined by observation for discolored water, sediment plumes, and filamentous algae. This location will then be described as accurately as possible using range finder coordinates from on shore land marks in order that we may return to that site at a future date. At the time when the coliform sample is taken, additional samples will be taken for pH, conductivity and other chemical analysis if warranted by a high conductivity values.

Sampling will be restricted to days not preceded by large rain storms in order to minimize contamination from surface runoff. To make this project successful the program will need to be done with little modification while in progress. The primary responsibility of FWI will be the completion of the monitoring activities. FWI will do as much as possible to facilitate any investigations by appropriate state agencies into specific problems. However FWI is not an enforcement agency and will not enter into such activities.

Representatives of DEC and DOH who attended a Science Advisory Board (SAB) meeting held in Albany agreed to support the surface water standards for contact recreation.

The DOH and DEC representatives had the following criteria for further investigation of a specific location.

1.* Total coliforms in excess of 2400 colonies/100 ml

2.* pH less than 6.0 or greater than 8.0

3.* Nitrate in excess of 10.0 mg/l

4. Fecal coliforms in excess of 200 colonies/100 ml

5. Fecal coliforms in excess of 100 colonies/100 ml if other indicators or observation support the need for further investigations

6. A fecal coliform: fecal streptococcus ratio of greater than 4

* = NYS Classification and Standards for Fresh Surface Water

These criteria must have been met on two occasions within a three day period. In the case of a public beach DOH will investigate, while in the case of a open lake site DEC will do the follow up work. At the time of the SAB meeting, the exact nature of the DEC Region 5 coliform survey program for the summer of 1984 had not been determined.

The exact extent of further investigation of a specific problem will be determined by the strength of supportive chemical data (supplied by FWI), site characteristics, topography, soil, degree of development and available personnel.

The overall goal of this program is not to pursue every site at which total coliform contamination is detected but to investigate significant pollution sources.

This program will be a significant source of information for years to come. The anticipated cost of the described program is $9,932. Any financial support that the Lake George

Association Fund can render at this time to help make this program possible will ultimately prove to be a great benefit to the Lake George Community.

REFERENCES

Bradley, D. S. and D. B. Aulenbach (1983). Statistical Analysis of New York State Department of Environmental Conservation Bacteriological Sampling Data. The Lake George Ecosystem Vol. III.

Clifford, R. (1982). Statistical Analysis of New York State Department of Environmental Conservation Bacteriological Sampling Data. The Lake George Ecosystem Vol. II.

Haas, C. and R. Clifford (1981). Statistical Analysis of New York State Department of Environmental Conservation Bacteriological Sampling Data. The Lake George Ecosystem Vol. II.

Kapur, R. (1982). Lake George Bacteriological Water Quality. Lake George Ecosystem Vol. II.

Sutherland, J. (1982). An Evaluation of Lake George Surface Water Bacteriological Monitoring Program. Internal Report.

WAPORA, Inc. 12/4/81. Needs Survey Report for the Lake George - Upper Hudson Region Waste Water Facilities PLan EIS Warren County New York. Submitted to US EPA Region II, 26 Federal Plaza, NY. NY.

REPORT ON THE LAKE GEORGE MONITORING PROGRAM
April 1983 - November 1983

Submitted to

Lake George Association

by

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Rensselaer Fresh Water Institute

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Troy, New York 12181

March 30, 1984

ACKNOWLEDGEMENTS

We wish to again thank the Lake George Association Fund for its financial support which made this monitoring program possible. Thanks also go to the Lake George Association and its members and leadership for their moral and financial support of our efforts to monitor and study Lake George. Finally the lay monitors have again given us valuable data which has helped us to better understand Lake George. Many thanks to all of you.

PREFACE

The samples were collected and analyzed by the Fresh Water Institute staff. Dean R. Long had responsibility for day to day on site operations of the program and is primarily responsible for its success this year. He was aided in the data analysis and report preparation by Lawrence W. Eichler, and Barry Indyke. Lisa Ginsburg and Barbara Peters also did much of the sampling and chemical analyses. Dr. Daniel H. Pope, Director of the FWI does, of course, have ultimate responsibility for the monitoring program and this report.

INTRODUCTION

During the past year, final reports have been submitted for the National Urban Runoff Program (NURP) (Sutherland 1983), the Lake George Upper Hudson Region Wastewater Facilities Plan (EPA-Dec. 1983) and the Clean Lakes Research Program (Siegfried 1982). All of these reports concern specific programs. However the Clean Lakes report also gives a more complete review of the current status of Lake George.

During the year construction has begun on:

1. The Sagamore project, both at Green Island and at the Golf Course (Federal Hill Project).
2. Top of the World.
3. Mohican Heights.
4. Clearing on Lamb Hill Road.
5. Numerous other small subdivisions throughout the basin.

This development pressure coupled with increased public awareness of the complexity of the Lake George ecosystem has reinforced our ideas that the whole Lake George watershed and not just the "wet part" of it (the lake and streams) requires monitoring.

The scope of the FWI's monitoring program has continued to change as our level of knowledge has increased. The basic goal, to provide a continuous lake monitoring program of high quality and stability, remains unaltered. During the past three years, we have expanded the lake monitoring program to include coliform monitoring and investigations in selected streams, wetlands and embayments (Coates et al., 1983, and Long et al., 1981, 1982 a,b, 1983). Expansion of the program has occurred without dilution of our efforts on the basic program to give long-term assessment of the water quality of Lake George. Finally we are this year, as in the past, proposing that new programs be added.

In addition to the Lake George Monitoring Program the Fresh Water Institute (FWI) has helped to support the research programs of other researchers, graduate and undergraduate students. Important programs such as these, while not funded by LGA Fund support are aided by the data collected from the programs supported by LGA Fund gifts.

Table 1. Support of Other Research Activities by FWI During 1983

	Researcher	Project
1.	C. George Union College	Dome Island Survey, both aquatic and terrestrial, for Nature Conservancy
2.	C. Hill-RPI Urban Planning Ph.D. Candidate	Ph.D. disseration on Planning in Lake George Basin
3.	L. Whitbeck-RPI MS Geology	Bolton Landing Quadrangle Surficial Geology map; seismic mapping of Dome Island; Surficial Geology Map of Lake George
4.	T. Perera RPI-MS Environmental Engineering	EPRI throughfall study (Acid Precipitation Program)
5.	U.S. Soil Service	Survey of Erosion Points on Finkle Brook

6.	D. Roberts-RPI Biology Ph.D. Candidate	Acid stressed macrophytes
7.	M. Osgood-RPI Biology Ph.D. Candidate	Microbiology of acid lakes
8.	G. Recer-RPI Biology, M.S.	Microbiology of acid lakes

The Bolton Landing site is a rainfall collection point on the Regional Integrated Lake Watershed Acidification Study (RILWAS) and serves as the field laboratory for the precipitation collection portion of this program. Many educational programs for students and lay audiences are also held at the Bolton Landing site.

SITES, COLLECTION SCHEDULES AND METHODS USED IN THE FWI LAKE GEORGE MONITORING PROGRAM

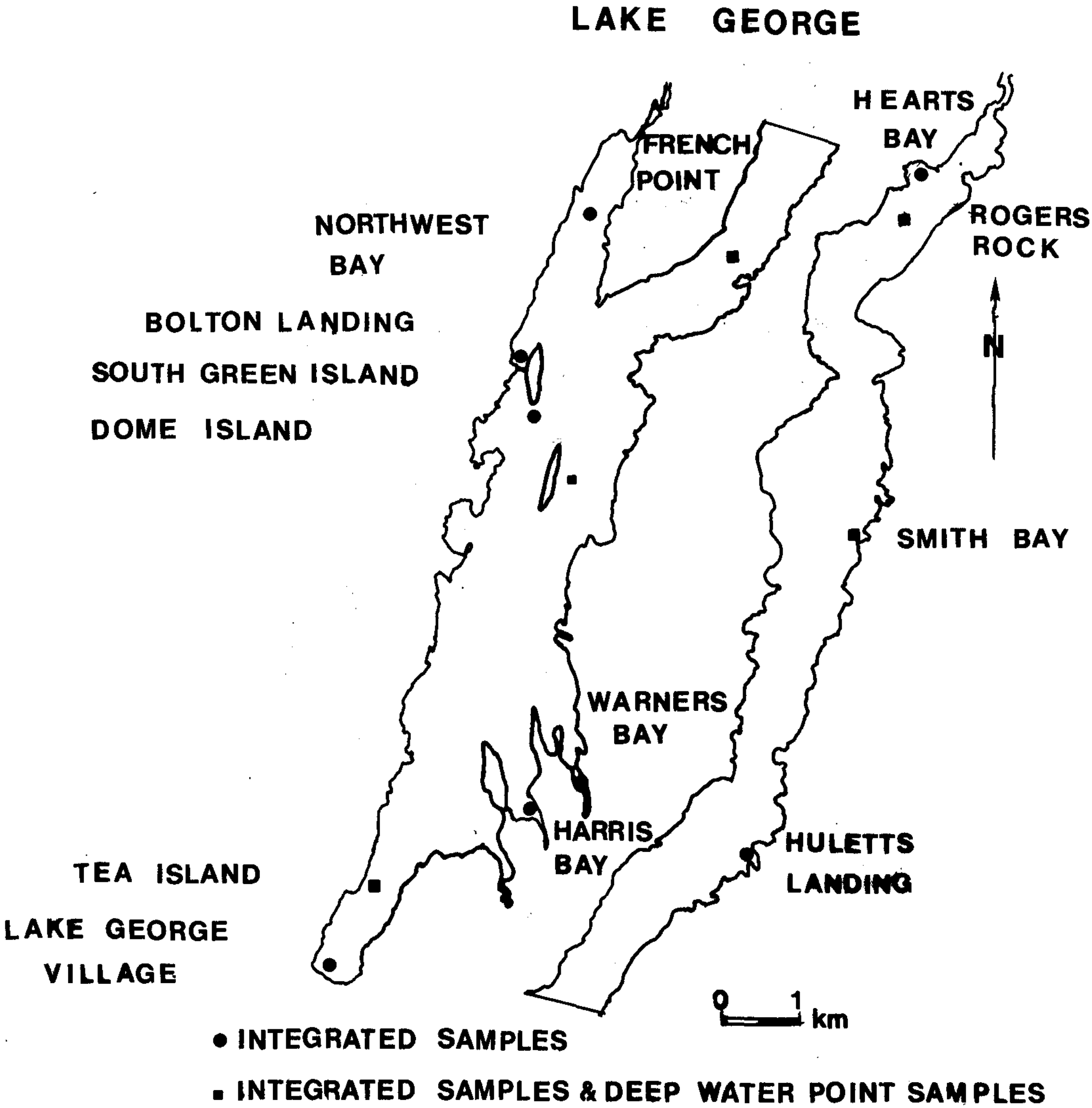
During the past year the monitoring program expanded into some new areas and consolidated in others. A sampling site, immediately south of the Sagamore property on Green Island (code B-10), has been added as along with a site just north of the Green Island bridge (code B-2). Two sites, one in Warners Bay (code W-10) and one in Harris Bay (code Y-10) were deleted from the study this year since data indicated that these sites were not substantially different from open lake sites (Long et al. 1983). No other changes in the number of sites or types of samples collected were made (Figure 1).

At each site various types of samples were collected: a surface grab for coliform analysis, an integrated sample to a predetermined depth (2,3,5, or 10 meters) and where possible a point sample at 20 m or 25 m.

Coliform samples were taken by submerging a wide mouth 500 ml bottle below the surface of the water and then inverting it to fill in such a manner that the mouth of the bottle was as far as possible from human skin. Care was taken to avoid collecting portions of the surface film in the sample.

Integrated samples, encompassing a portion of the water column, were collected with a PVC hose. The hose was weighed at one end and lowered to the desired depth. The opposite end of the tube was sealed and the entire tube retrieved. The sample was drained

Figure 1. Lake George Sampling Sites



into a collection bottle and mixed. Aliquots were taken from this bottle until sufficient volume was available for all analyses. Integrated samples were collected at all stations. At stations where the depth was 20 meters (m) or greater, deep water point samples were also taken using a Van Dorn collection bottle.

The first sampling was attempted March 29, 1983 but due to very severe weather and ice in the bays, it had to be cancelled. A complete sampling took place April 12 and 13, 1983. The lake was isothermal (unstratified) from April 12 to June 3 (Spring season) and thermally stratified from June 14 - October 5 (Summer season). The lake was destratified and nearly isothermal by the last sampling November 1 and 2, 1983.

At each site, the following measurements were made if conditions permitted: i) secchi depth, ii) temperature, and iii) dissolved oxygen using a YSI model 54 D.O. temperature meter. Immediately upon returning to the field laboratory the following were completed: i) pH (US EPA, 1979, 150.1), ii) conductivity (US EPA 1979, 120.1), iii) dissolved oxygen using Winkler Azide modification (Standard Methods 15th edition) and iv) orthophosphate or molybdate reactive phosphate (Strickland and Parson 1972). If time allowed, total phosphorus, and total filterable phosphorus were analyzed immediately (Strickland and Parsons 1972) otherwise these samples were stored frozen until analyzed. Using a separately stored aliquot, nitrate was analyzed using the cadmium reduction method (US EPA 353.2, 1979), ammonia using the alkaline phenol method (US EPA 350.1, 1979), chloride using the ferricyanide method (US EPA

325.2, 1979) and soluble reactive silica using the molybdate reaction method (Strickland and Parsons, 1972). An unfiltered sample was acidified prior to storage for subsequent analyses for sodium and calcium using flame atomic adsorption spectrophotometry (US EPA 273.3, 215.1, 1979).

Chlorophyll a was measured using the spectrophotometric monochromatic method which involves extraction with a 90% acetone solution (Strickland and Parsons 1972). Water samples (2-4 liters) were concentrated prior to extraction on glass fiber filters (Gelman GA).

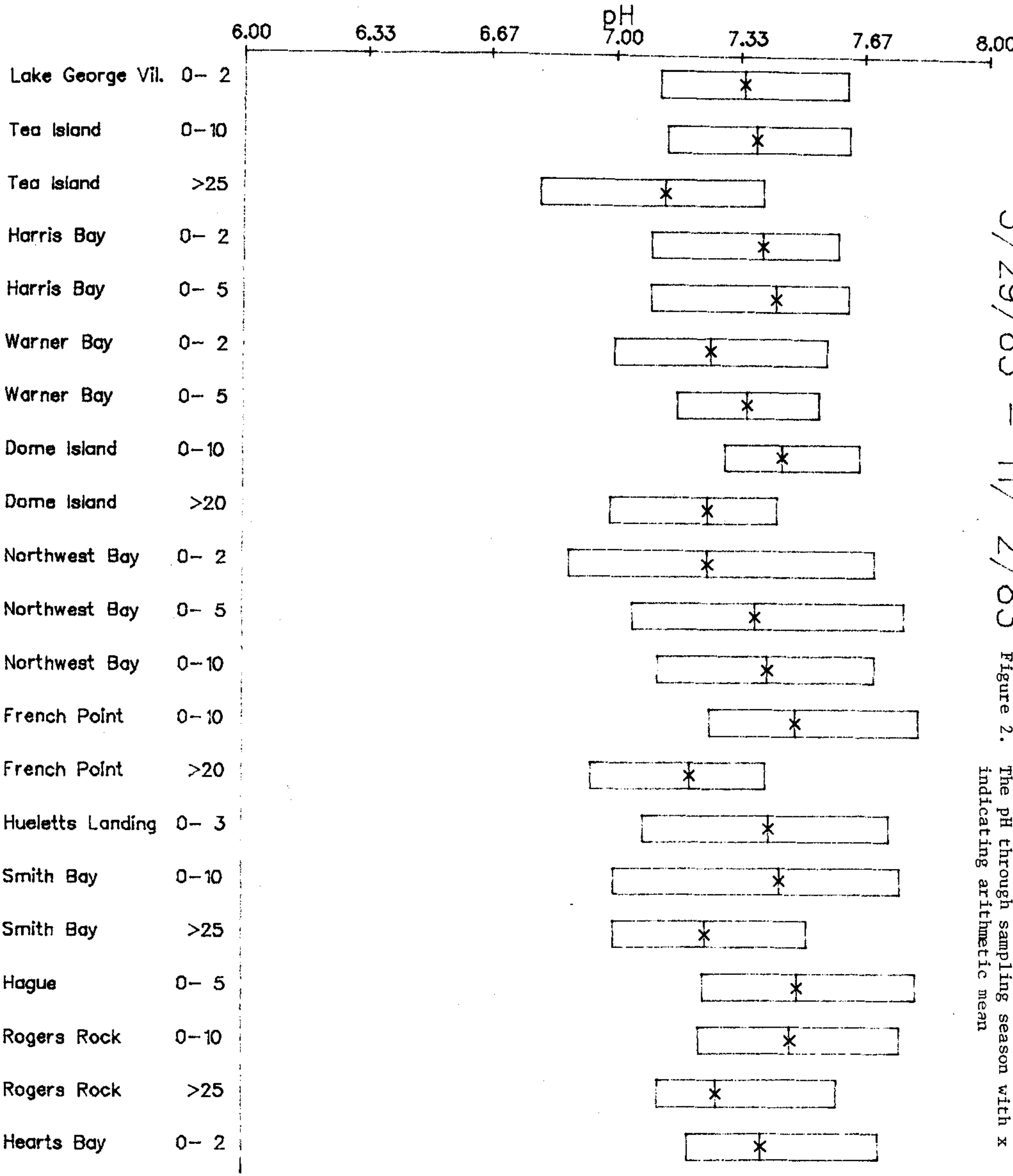
RESULTS

The winter of 1982-1983 was unusual in that very little snowfall was recorded (58.3 inches Glens Falls, FFA) which resulted in a snowpack of less than 20 inches. (Glens Falls, FFA). In April only 5 inches of snowpack remained. The lake was ice covered for only a very short period of time during late January and early February. Ice cover was off the main portion of the lake by March 21-22 1983, but both Harris and Warners Bay still had solid ice on March 29, 1983.

During April 6.46 inches of rain was recorded which is 3.36 inches above normal and May had 7.19 inches of rain, 4.14 inches above normal (Glens Falls, FFA). The rest of the summer was dry with only sporadic rain showers.

The lake became thermally stratified at Tea Island, Dome Island, French Point and Northwest Bay (Northwest Bay site is not in the appendix) around June 14 (Appendix 1 a-c) at a depth of less than two meters. At these locations a 2.0°C decrease in temperature over one meter vertical distance was found. Shortly after stratification, pollen fall occurred, producing a bright yellow film on the water surface. As the pollen slowly sank it became trapped at the thermocline (the point where the 2.0°C temperature change was found over a meter of vertical distance).

The lake was circumneutral in pH during all times of the year (Figure 2). Values of pH less than 7.0 were generally observed in deep water point samples collected from Tea and Dome Islands. At



3/29/83 – 11/2/83

Figure 2. The pH through sampling season with x indicating arithmetic mean

the 0-2 m site in Northwest Bay pH values of less than 7.0 were also observed prior to thermal stratification (Appendix 2).

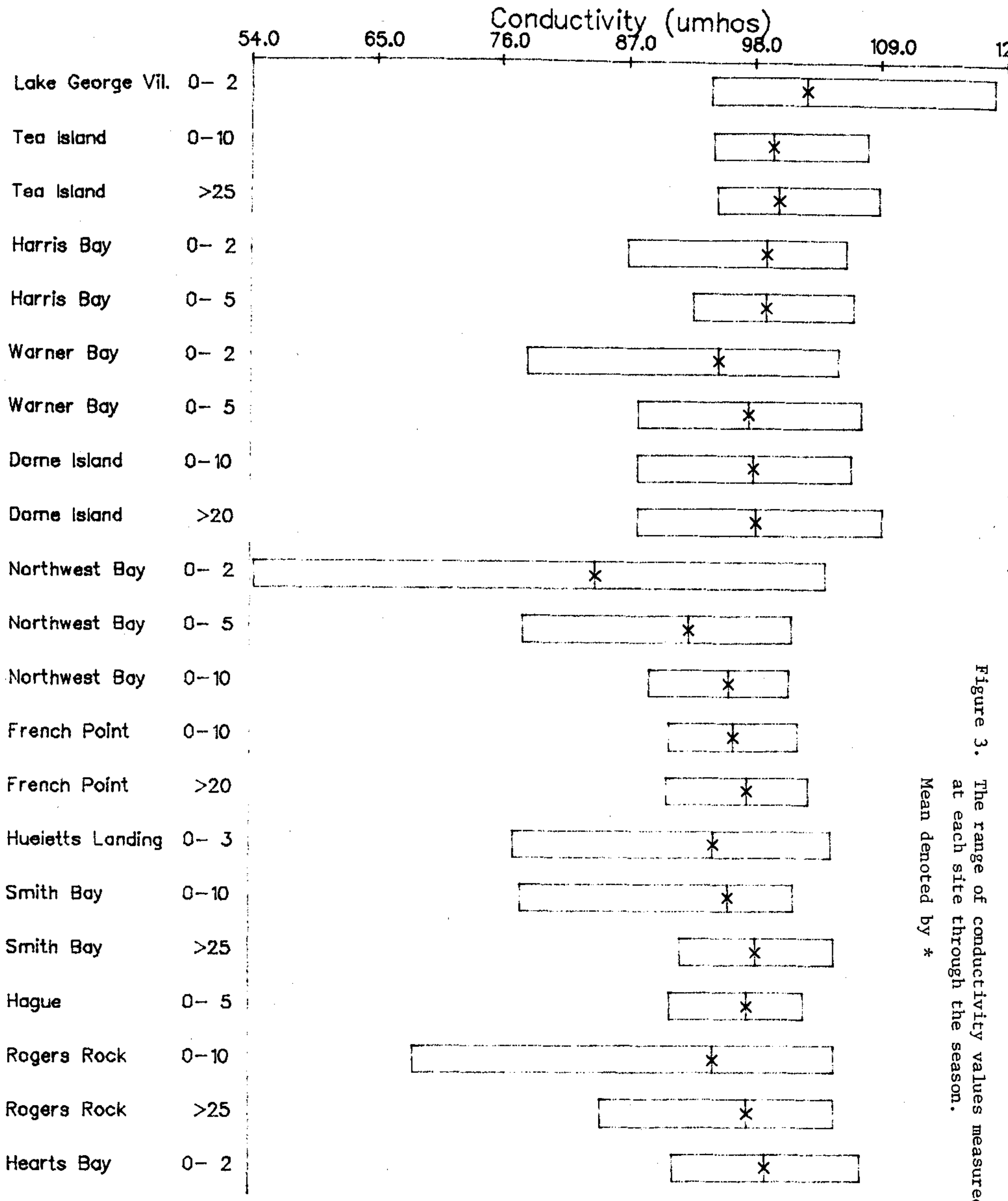
Conductivity, a measure of total dissolved substances present in the water generally ranged from 96 to 119 umhos (Figure 3). On a few occasions, lower values were found at the Northwest Bay 0-2 m site. Low conductivity measurements usually coincided with depressed pH (Appendix 2,3). On July 8, at the Rogers Rock 0-10 m site, a low conductivity reading, of 68.4 umhos, was measured (Appendix 3).

The concentration of chloride followed the same trend as conductivity (Figure 4) but with less variation throughout the year. The low conductivity in the sample from Rogers Rock on July 8 also had a low chloride concentration (Appendix 4). Chloride levels for the last three samplings at Hearts Bay (Appendix 4) were two to five times greater than normal.

Detectable amounts of nitrate and ammonia ($\geq$0.01 mg/l) were found numerous times this year (Appendix 5, 6, Figure 5). The mean nitrate concentrations of integrated samples were 0.01 and 0.0009 mg/l, respectively for the 0-2 and 0-10 meter samples. Median values for nitrate and ammonia were below 0.010 mg/l.

Differences between nitrate found in the surface water, as represented by a 0-10 m integrated sample and deep water point samples at Dome Island and Smith Bay have been found. The differences observed during the 1983 sampling were greater than those reported for previous years.

The levels of soluble reactive silica were highest in the near



3/29/83 – 11/2/83

Figure 3. The range of conductivity values measured at each site through the season. Mean denoted by *

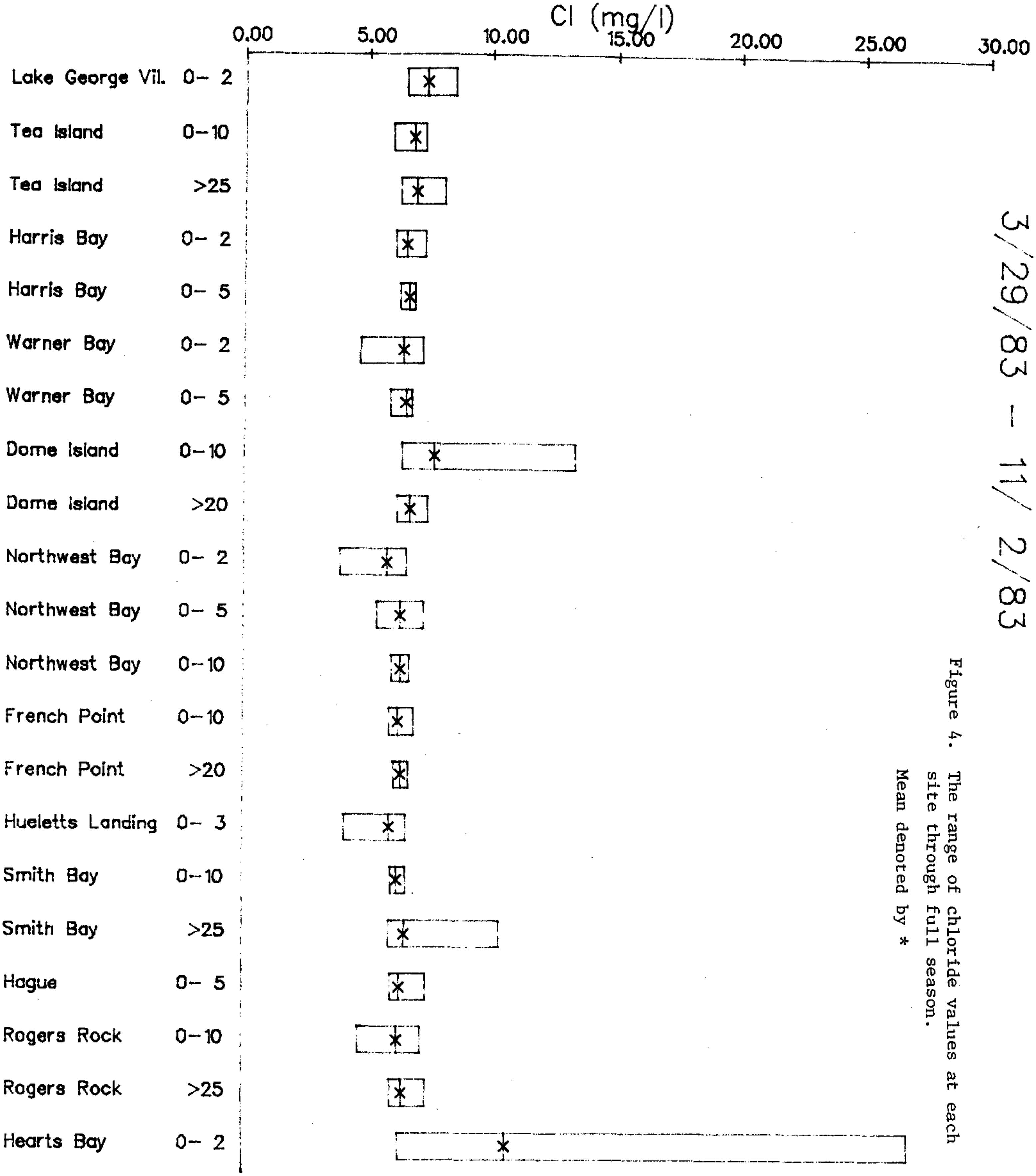


Figure 4. The range of chloride values at each site through full season. Mean denoted by *

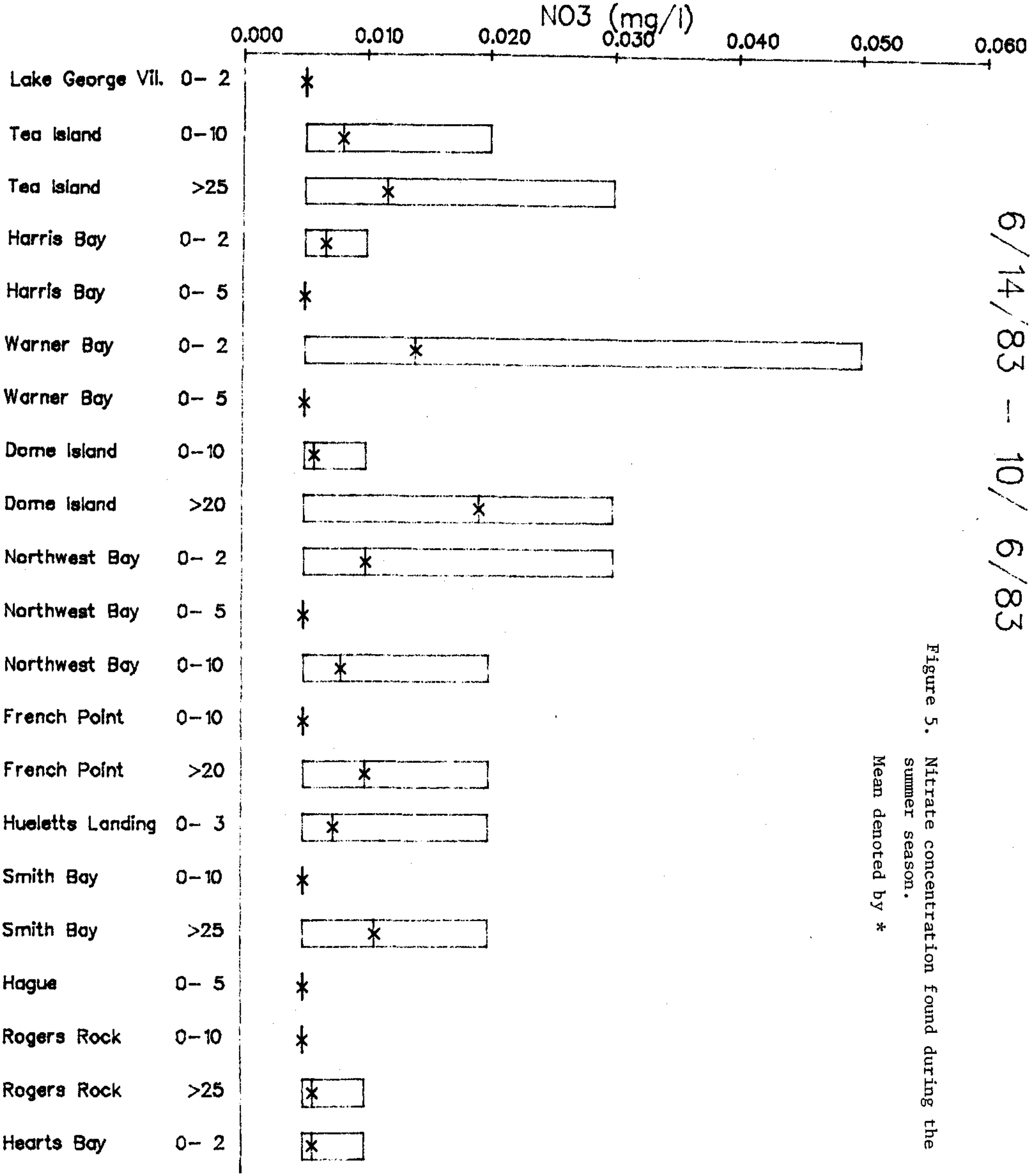


Figure 5. Nitrate concentration found during the summer season.
Mean denoted by *

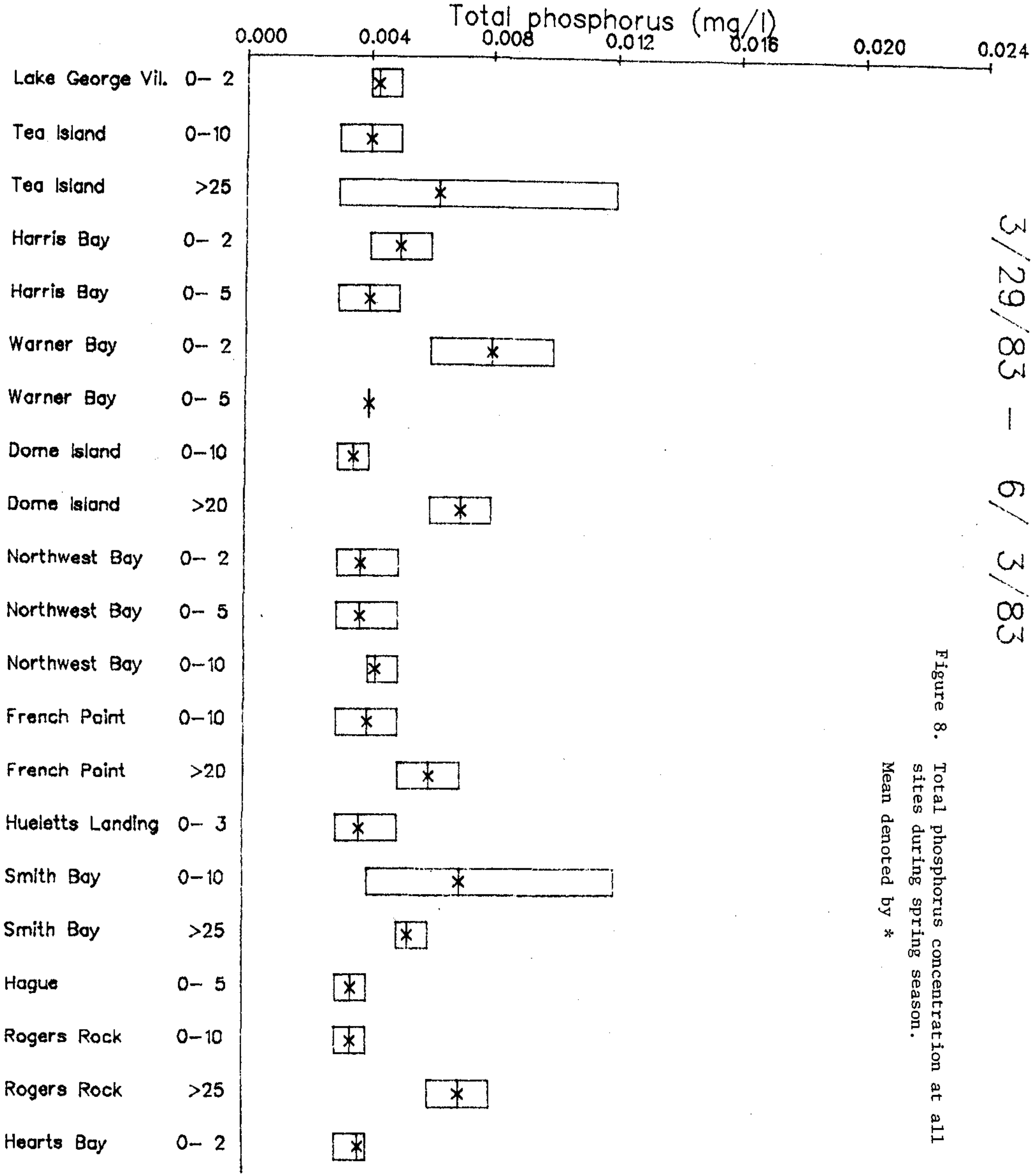


Figure 8. Total phosphorus concentration at all sites during spring season. Mean denoted by *

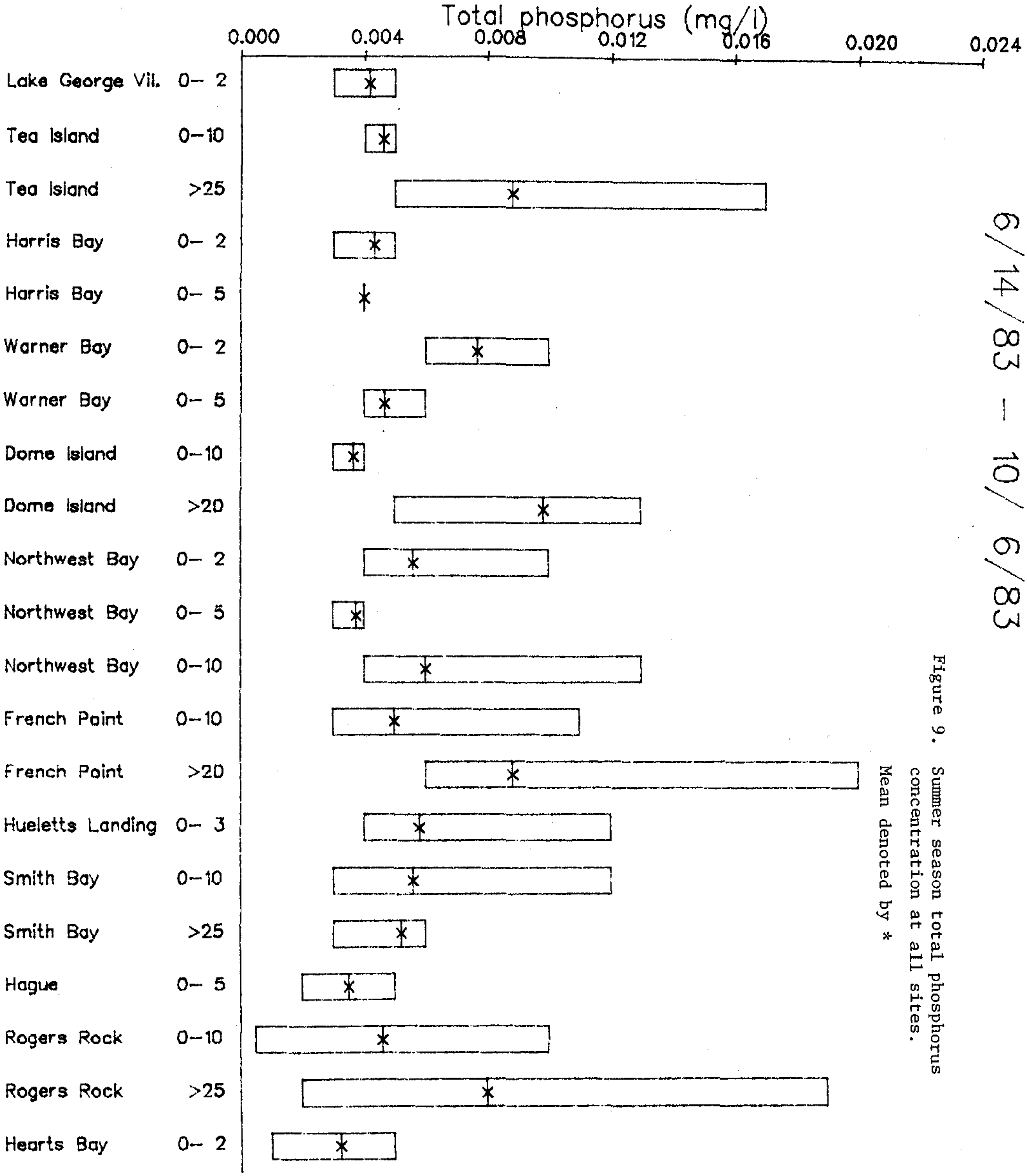


Figure 9. Summer season total phosphorus concentration at all sites. Mean denoted by *

shore areas, especially in the Northwest Bay 0-2 m sample (Appendix 7). A comparison of soluble reactive silica at the deep sites during thermal stratification, (Figure 7 a,b), indicated that the greatest differences in concentration between shallow and deep water samples are found at Tea Island and French Point. One of the lowest concentrations found was in the Rogers Rock 0-10 m sample on July 8, 1983 which coincides with low chloride concentration and conductivity measured that day on the same samples (Appendix 7). The range of values for soluble reactive silica samples taken from 10 m or less using the integrator technique was 0.4 to 1.36 mg/l. For deep water point samples of 20 m or greater, the range was 1.1 to 1.8 mg/l for the entire year (Appendix 7).

Total phosphorus levels in the Tea Island >25 m and Smith Bay 0-10 m samples varied considerably during the spring months. All other sites showed less variation in total phosphorus. Total phosphorus concentration in Warners Bay at the 0-2 m site was consistently higher than at other sampling locations (Figure 8). At Northwest Bay the shallow sites had spring mean total phosphorus levels of 0.0038 mg/l (3.8 ug/l) at the 0-2 and 0-5 m sites while at the 0-10 m site, levels of 0.0043 mg/l (4.3 ug/l or ppb) were recorded. The trend toward lower total phosphorus concentrations in the near shore area as compared to the offshore deep water areas, was contrary to the situation found at other bay sites. During the summer months (6/14-10/6), similar findings of higher total phosphorus levels at the Northwest Bay 0-10 m site than in the nearshore area were observed (Figure 9). A comparison

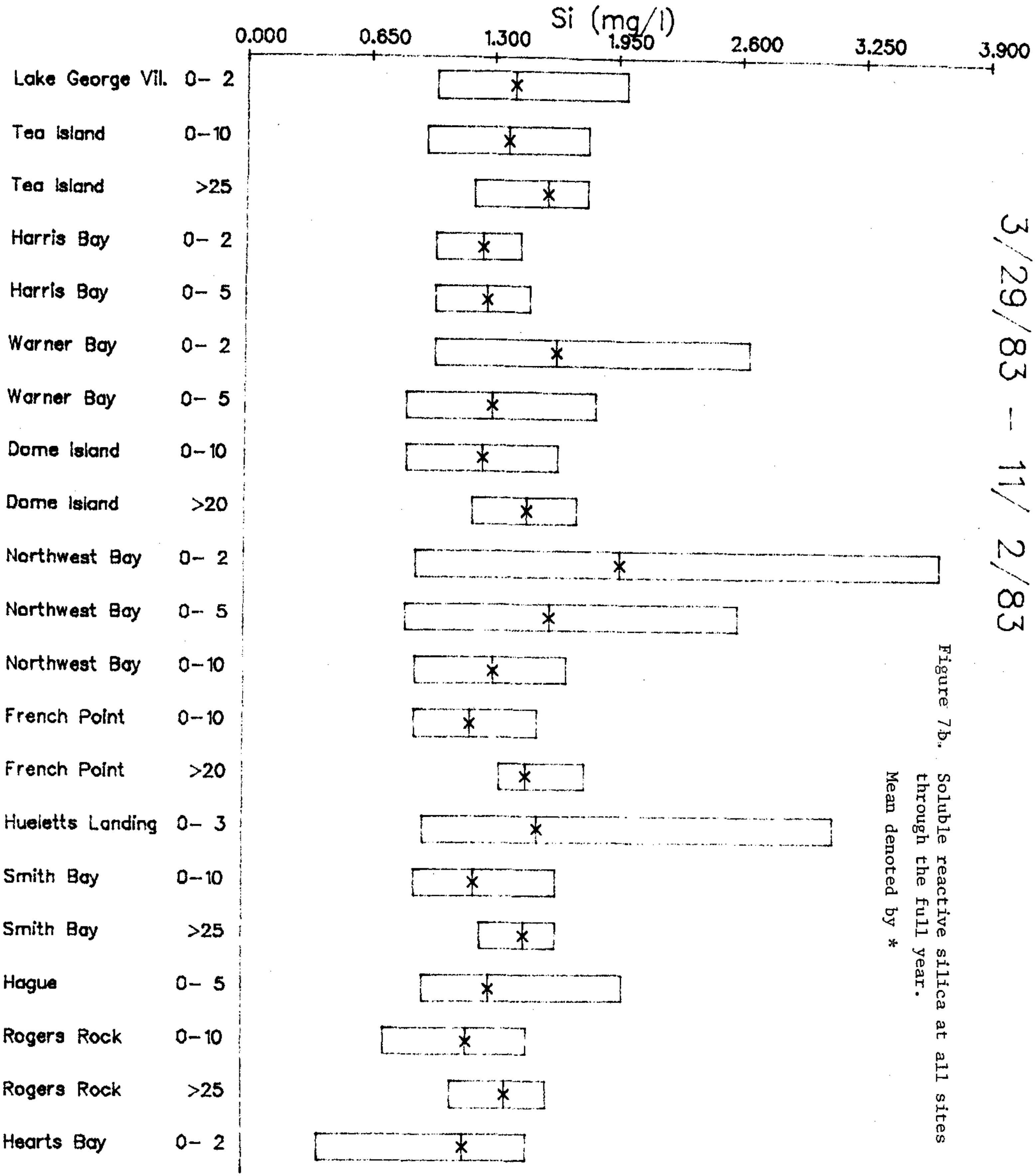
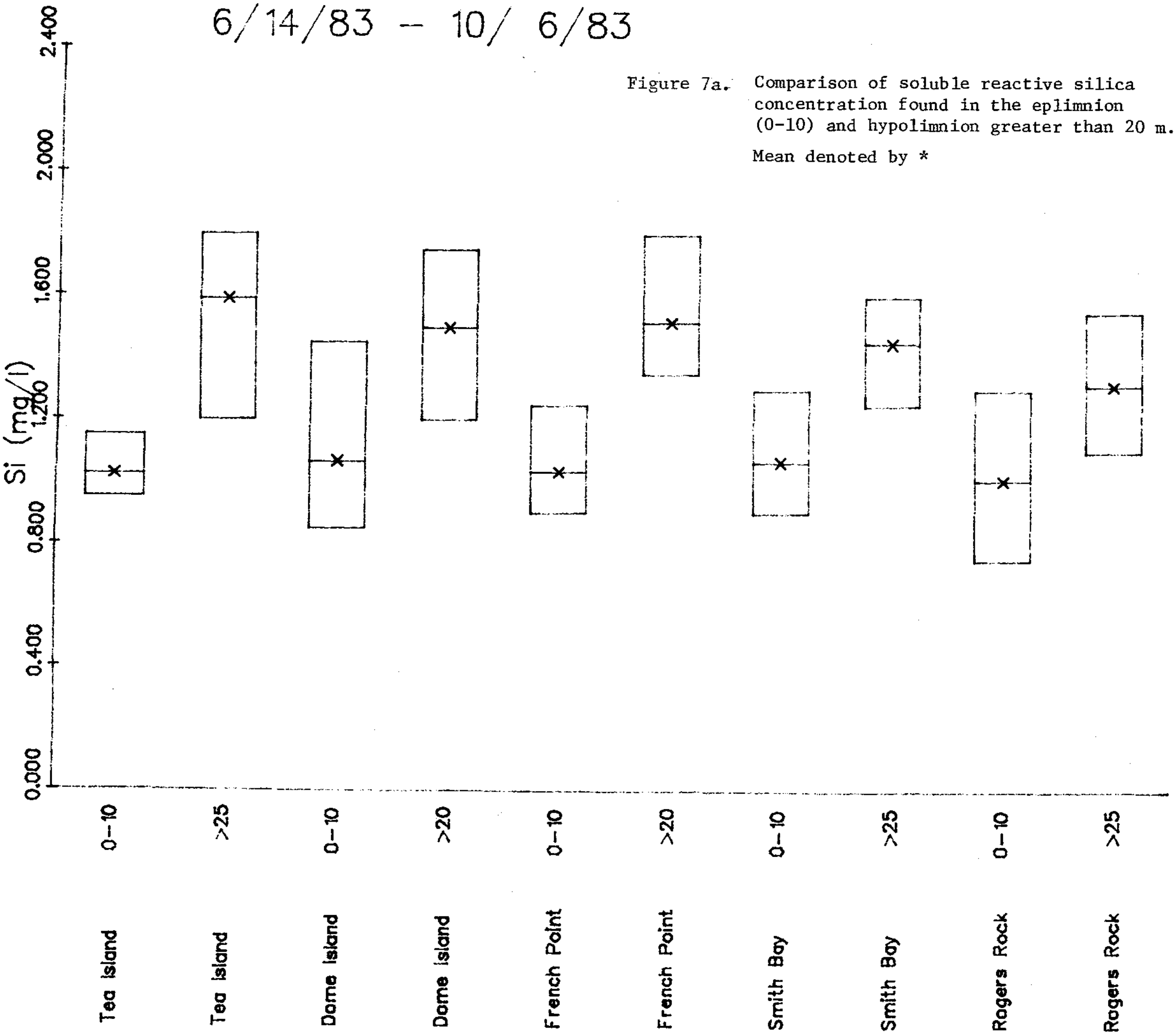


Figure 7b. Soluble reactive silica at all sites through the full year. Mean denoted by *

6/14/83 — 10/ 6/83

Figure 7a. Comparison of soluble reactive silica concentration found in the eplimnion (0-10) and hypolimnion greater than 20 m.

Mean denoted by *



of surface water to the underlying deep water at Tea Island, Dome Island, French Point and Rogers Rock showed that roughly a 2 fold increase in the mean concentration of total phosphorus was found in deep waters as compared to that in surface waters (Figure 10). At Smith Bay, total phosphorus concentration was similar throughout the water column (Figure 10). Total phosphorus concentrations in Warners Bay continued to be higher than other sites, with the exception of the deep water point samples discussed above (Figure 10). The mean summer concentration of total phosphorus at all sites was 0.0048 mg/l (4.8 ppb) for integrated samples.

Total filterable phosphorus values exhibit many of the same trends observed for total phosphorus but to a lesser extent (probably due to the fact that total filterable phosphorus is a component of total phosphorus, see Figures 11 and 12).

Sodium concentrations exhibited pronounced seasonal trends with highest values reported in the spring (Appendix 11, Figure 13) and a gradual decrease throughout the summer. Sodium concentrations decreased along a transect from Lake George Village to the northern end of Lake George with mean values of 4.69 at Lake George Village and 3.98 at Rogers Rock during the spring (3/29-6/4) (Figure 13).

The concentration of chlorophyll a is indicative of the number of phytoplankton found in the water column. A high concentration of chlorophyll a indicates a large number of phytoplankton in the water sample. During the spring months

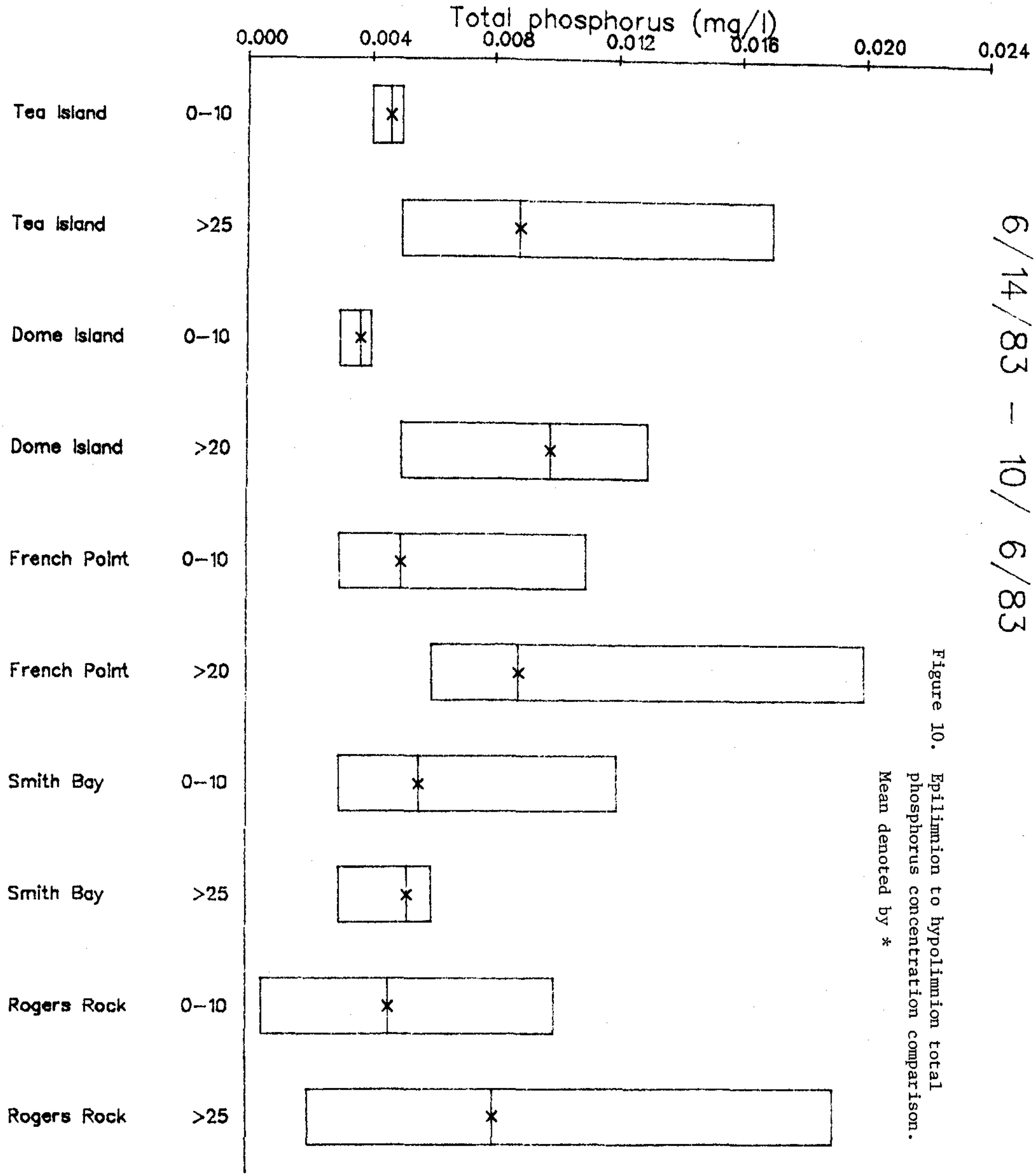
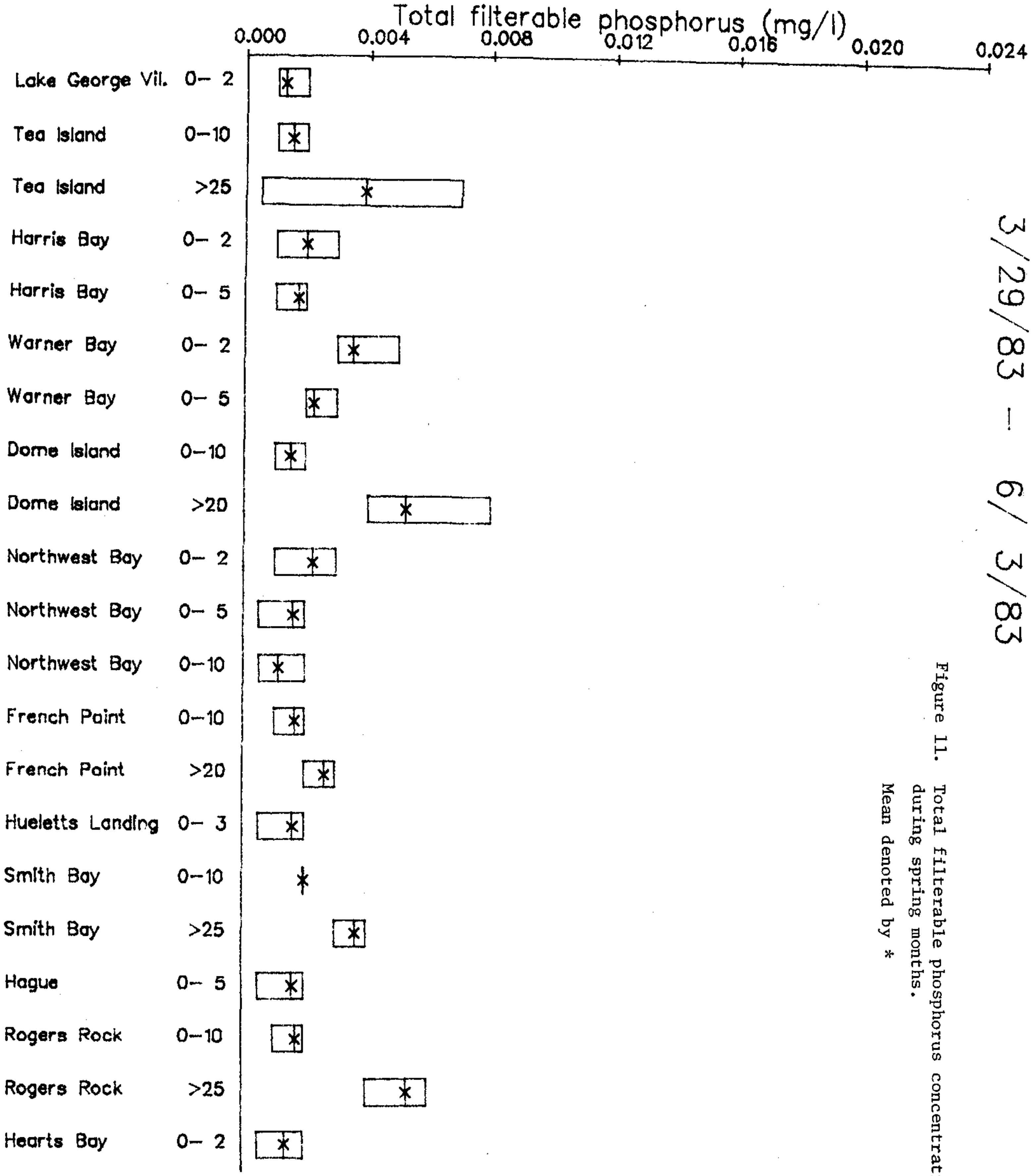


Figure 10. Epilimnion to hypolimnion total phosphorus concentration comparison. Mean denoted by *



3/29/83 – 6/3/83

Figure 11. Total filterable phosphorus concentration during spring months.
Mean denoted by *

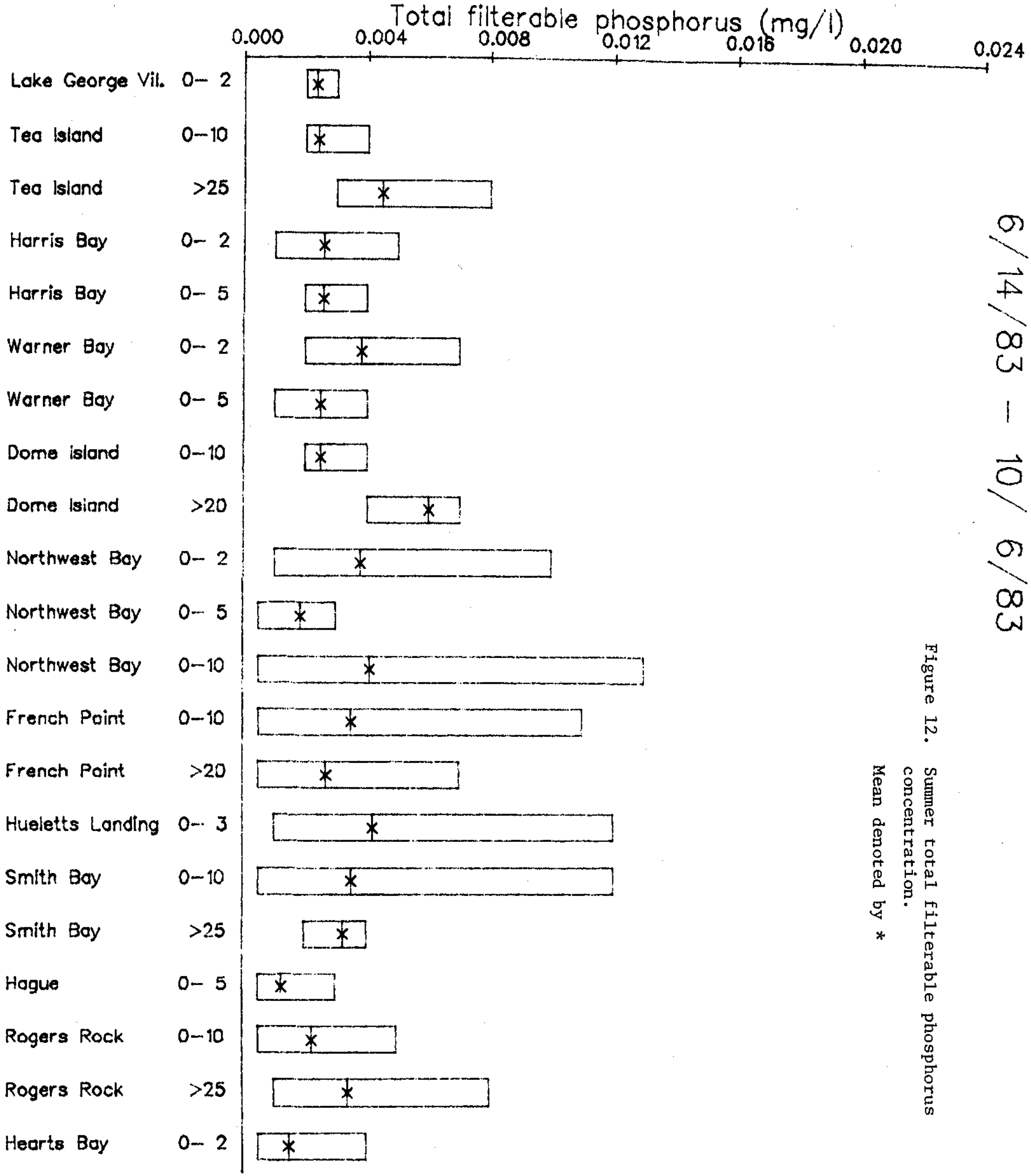
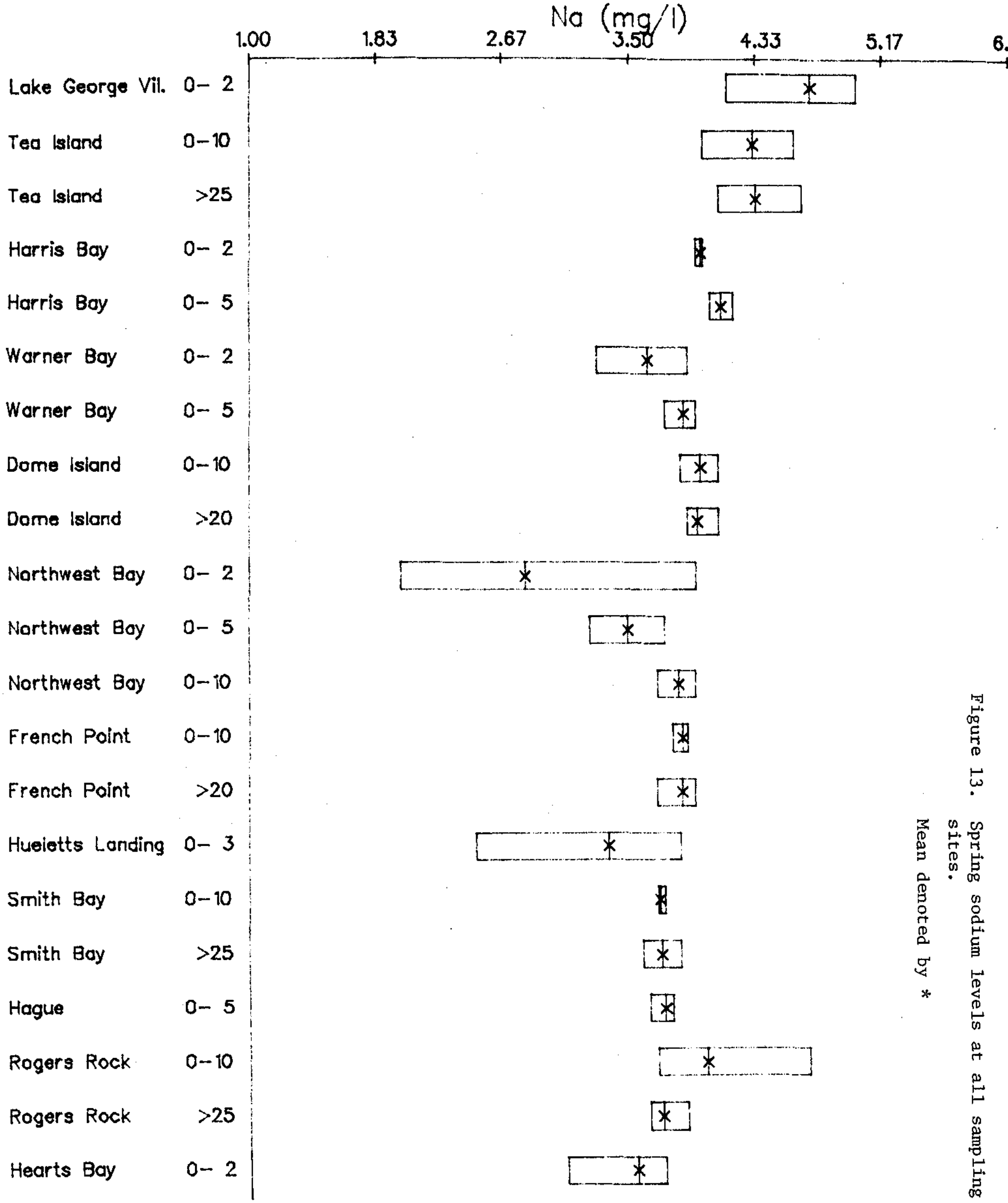


Figure 12. Summer total filterable phosphorus concentration.
Mean denoted by *

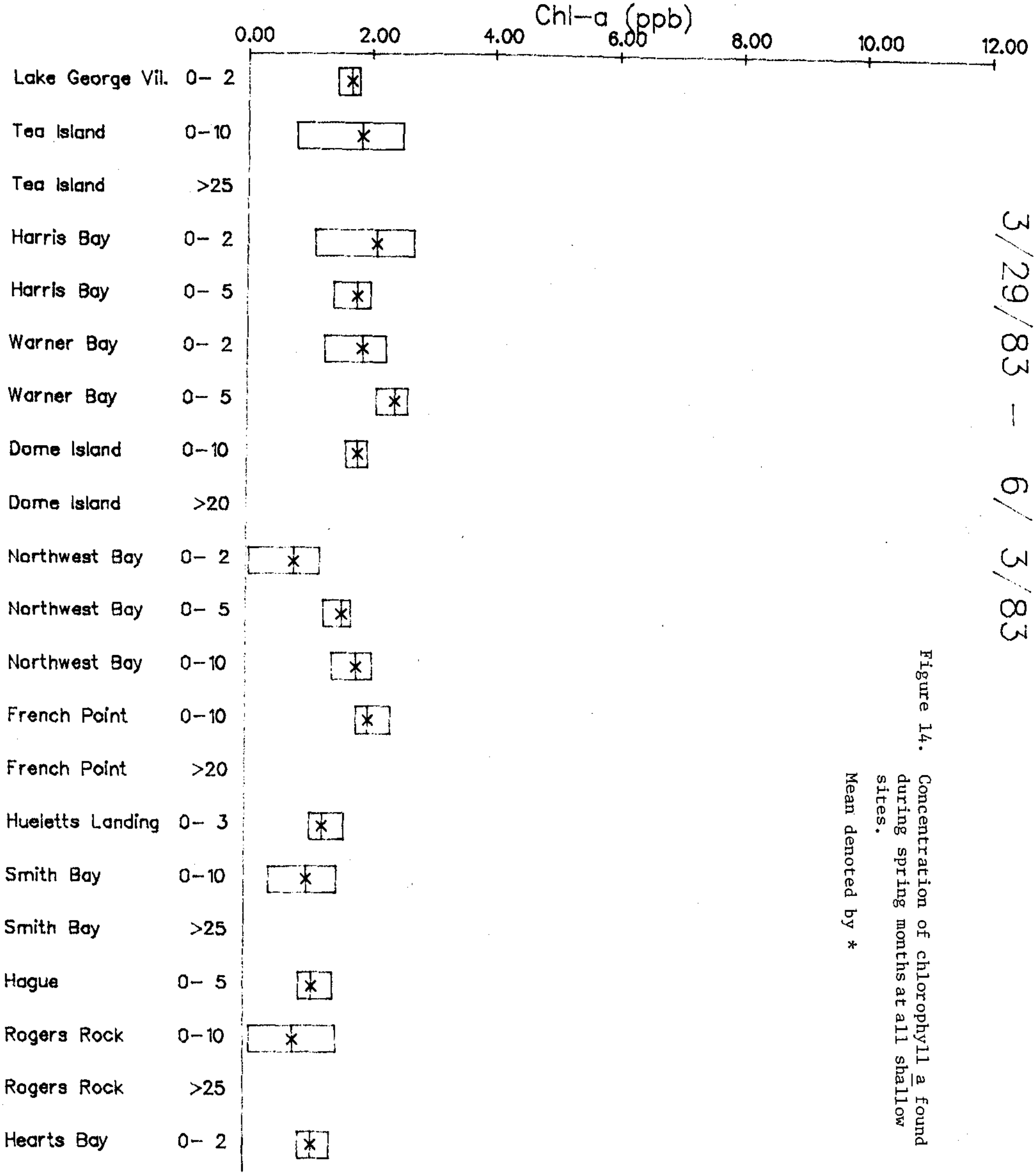


3/29/83 – 6/3/83

Figure 13. Spring sodium levels at all sampling sites.
Mean denoted by *

chlorophyll a concentrations ranged from 0.05 to 2.7 ug/l (ppb) (Figure 14). The highest mean level for chlorophyll a was found at Warners Bay 0-5 m while lowest levels were recorded at Northwest Bay 0-2 m and Rogers Rock 0-10 m sites.

The highest mean concentration of chlorophyll a (1.98 ug/l) in the offshore areas was found in French Point and Northwest Bay 0-10 m samples. Chlorophyll a concentrations were higher offshore at the Northwest Bay 0-10 m site than in shore, a trend that is similar to that found for total phosphorus (Figure 8,9). The levels of chlorophyll a found during the summer months ranged from 0.05 to 11.0 ug/l (ppb) (Figure 15) with the highest concentrations found at the Warners Bay 0-2 m site (Appendix 12). Summer values are only slightly less than those found during the spring months. Pheophytin a concentrations were also found to be highest during the summer months (Appendix 13).



3/29/83 – 6/3/83

Figure 14. Concentration of chlorophyll a found during spring months at all shallow sites.

Mean denoted by *

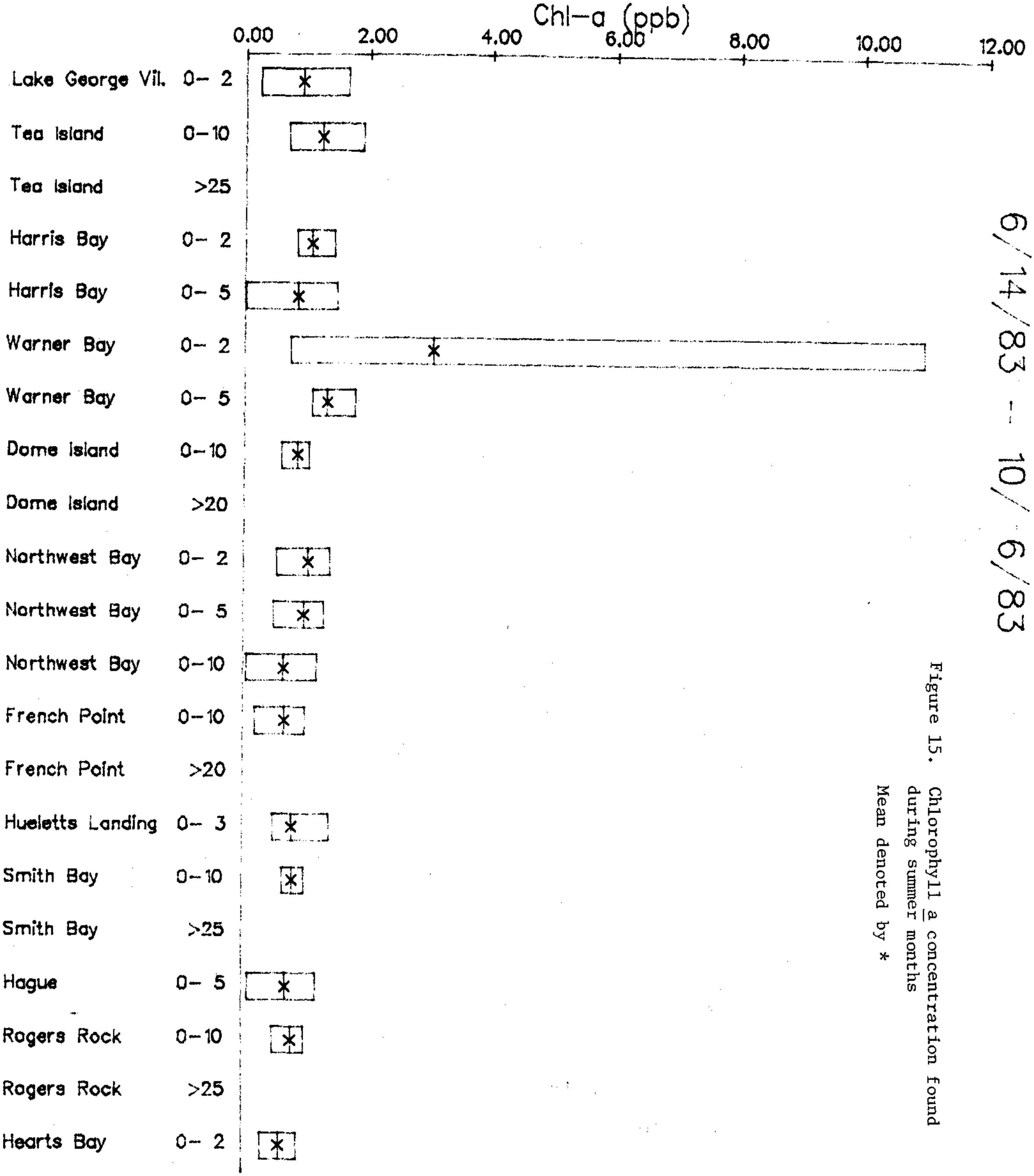


Figure 15. Chlorophyll a concentration found during summer months
Mean denoted by *

DISCUSSION

The unusual winter of 1982-1983 probably had quite significant effects on nutrient cycling in Lake George. The short duration of ice cover along with lack of snow on the ice allowed active photosynthesis to occur in some of the plants and phytoplankton in the lake throughout the winter (Boylen and Sheldon 1976). The phenomena should have resulted in fewer nutrients being available following ice out in the spring. Since no "through the ice" sampling was done, due to instability of the ice during the winter of 1982-1983, we do not know levels during the winter. However, lower levels of total phosphorus and/or nitrogenous compounds were not found in the spring. Also it should be noted that although specific effects on nutrient cycling cannot be attribute to the high water or shallow depth of thermal stratification and heavy pollen fall, these should be considered when reviewing the data.

During the period April 10-30, 5.68 inches of rainfall was recorded at Glens Falls Airport and no snowpack remained. Heavy rains have been known to depress the pH of Adirondack streams (Galloway et. al. 1983). These heavy rains may have depressed the pH of Northwest Bay Brook and subsequently the pH recorded at the monitoring site at the outfall of Northwest Bay Wetland. The pH of total precipitation (wetfall + dryfall) was 4.68 while wetfall pH was 4.49 (RILWAS unpublished field data). The depressed pH may also be the result of flushing of the wetland's accumulated plant degradation products. If this were the case high levels of total phosphorus, nitrate and ammonia should be found. However only nitrate was elevated above ambient levels (Appendix 5,6,8). Nitrate is a constituent of acid deposition (Altwicker and Johannes 1983). The reduced conductivity (Appendix 3) indicates dilution by a low ionic strength solution. All these effects were noted at the outfall of the wetland (Northwest Bay 0-2 m) and were not seen further out in the lake (Northwest Bay 0-5 m). Periodic acidification of Northwest Bay Brook by heavy rainfalls following iceoff and snowmelt could interfere with the normal spawning runs of the Rainbow Smelt, Osmerus mordax, which occur when stream temperatures are in the range of 8-10°C (46-50°F). If spawning were interrupted in Northwest Bay Brook, due to acid stress, a reduced level of spawning might occur in the rocky shoals of the lake itself (Scott and Crossman 1973) thereby preventing a total failure of recruitment. It should be noted that a stable rainbow smelt population is necessary to support the salmonid sport fisheries of Lake George.

The high concentration of soluble reactive silica found at the outfall of Northwest Bay wetland is also indicative of a runoff source for nutrients rather than being derived from plant degradation by-products in the wetland. Soluble reactive silica did not reach concentrations low enough to be limiting to diatom growth (Schelske et al. 1972) except at Hearts Bay in late September when concentrations were less than 0.5 mg/l. The lack of overlap in the concentration of soluble reactive silica between the epilimnion (0-10 m integrated samples or zone above thermocline) and the hypolimnion (zone below thermocline or 20, 25 meter point samples) of Tea Island and French Point indicates that the biomass of diatoms at these locations is greater than other deep water sites (such as at Dome Island). In the case of Tea Island, higher productivity is attributable to greater nutrient loading (Sutherland, 1983) while at French Point most investigators consider increased productivity to be due to mixing and upwelling of nutrients from the hypolimnion (Stewart 1972, Long, et al. 1981, Siegfried 1982). The other "north lake" sites (Smith Bay and Rogers Rock) do show considerable overlap in soluble reactive silica concentrations indicating a lower rate of utilization of silica and a concommitant low diatoms biomass.

The level of utilization of soluble reactive silica at French Point indicates greater diatom biomass at this site but the level of chlorophyll a indicates a lower total phytoplankton biomass (green algae and blue green algae do not utilize silica) as compared to Dome Island (Schelske et. al. 1972).

The levels of nitrate found in the epilimnion were low (0.01 mg/l) with the exception of sampling sites in areas of higher levels of human population or receiving direct outfalls from wetlands. At the deep water sites below the thermocline nitrate concentrations (probably as a result of active decomposition of accumulated materials, Wetzel 1975) were found to be 2 to 4 times higher than in surface waters. A difference between the hypolimnion and epilimnion concentrations of nitrate was observed at Smith Bay, where previously little or no difference had been detected (Long et. al. 1981). This may have been due to increased logging activities, dock building etc. in that area. The large fluctuations in nitrate values at all sites during the spring may have been the result of mixing following iceoff and the heavy rains.

The concentration of total phosphorus in the epilimnion remained at nearly the same level (0.0048 mg/l or 4.8 ppb summer mean surface water, 1-10 m) as seen in the three previous years (Long et. al. 1981, 1982 a,b).

The levels of total phosphorus in Warners Bay remained higher (0.0076 mg/l or 7.6 ppb) than those found in the rest of the lake. However at the 7.6 ppb level, it is lower than that found in previous years. It has been shown (Collins 1983, Long et. al 1983) that the wetland adjacent to Warners Bay is a probable source of considerable nutrients to the lake. The dry weather this past summer may have resulted in reduced flow from the wetlands to the bay, resulting in lower TP concentrations. In addition, the complex forms of total phosphorus that come out of these wetlands are not fully available as nutrients (Jackson and R. E. Hecky, 1980, Collins et al. 1983).

At Tea Island and Dome Island the summer hypolimnion total phosphorus concentrations increased 2 ug/l above levels previously found during summer months (Long et al. 1981, 1982b). These increased levels of total phosphorus indicate that greater biological decomposition activities may be occurring in the deep waters. This increased decomposition could be a result of greater amounts of biological matter being produced in the water column at these sites. (Wetzel 1975). The increased level of total phosphorus in the hypolimnion is a trend opposite to that of stable concentrations of total phosphorus, found in the epilimnion of the lake.

At Smith Bay the epilimnion and hypolimnion total phosphorus concentrations were very similar (Figure 9). This is very unusual and may indicate that the hypolimnion is not enriched with respect to total phosphorus concentration.

In the past numerous investigators working on Lake George have alluded to the possibility that more than one nutrient is limiting. (Williams et al. 1973, Long et al. 1982 a, Shapiro 1983). Rather than examine the nutrient levels as individual quantities, ratios of nutrients can be used since cells utilize nutrients in specific combination. The concern is whether blue green algae or diatoms are favored by particular nutrient ratio(s). For example, blue green algae tend to be associated with more eutrophic waters. The reason for dominance of blue greens at low N:P ratios is that some of these algae are capable of fixing atmospheric nitrogen (Smith 1983). To facilitate comparison of Lake George results with data reported for other lakes we found it necessary to sum the concentrations of nitrate and ammonia to give a value for nitrogen containing compounds. Nitrite was not included since it has not previously been detected with any regularity (Long et. al. 1981, Siegfried 1982). The results of this analysis (see Table 2) indicate that available nitrogenous compounds present in Lake George are approximately 20 ug/l. Total nitrogen concentrations of 200 ug/l were commonly measured by Siegfried (1982). Total nitrogen as reported by Siegfried is measured on a digested unfiltered sample which includes cell bound nitrogen compounds. Combined nitrogen concentrations derived from FWI data include only available nitrogen compounds, (those not already incorporated into protoplasm and/or colloids). Ratios developed for the Great Lakes used only nitrate concentrations and ignored ammonia since it was not detectable. The sum of nitrate and ammonia compounds present in Lake George are nearly equal to the concentration of nitrate found in the Great Lakes (Schelske 1975). It seems reasonable for us to use this estimate for N-compounds (sum of nitrate and ammonia) since it is of the same magnitude as that found in the Great Lakes. For these reasons use of nutrient ratio developed on the Great Lakes is applicable to Lake George.

Table 2

Mean Summer Epilimnion Nutrient Concentrations

	N compounds (1) ug/l	TP ug/l	Si ug/l
Caldwell Basin (2)	21.3	4.3	105
South Lake (3)	24.0	4.4	118.2
North Lake (4)	28.6	4.7	108.4

	TN:TP	N compounds:TP	Si:TP
Data Source (5)	40:1		
Data Source (6)	20:1		
Data Source (7)		5:1 to 6:1	23:1 to 26:1

(1) The number reported in the table is the sum of nitrate and ammonia concentrations from this report. Nitrite values were not included since nitrite has not been detectable except in rare cases (see previous reports, Long et. al. 1981, Siegfried 1982).

(2) Caldwell Basin, Tea Island 0-10 m Lake George Village 0-2 m.

(3) South Lake, Dome Island, 0-10 m, Warners Bay 0-5 m, Harris Bay 0-5 m and Northwest Bay 0-5, 0-10 m.

(4) North Lake Huletts Landing, Smith Bay 0-10 m, Hague, Rogers Rock 0-10 m, Hearts Bay 0-2 m.

(5) Siegfried 1982, TN of 0.2 mg/l; Long et al. 1981; 1982, TP 0.005 mg/l.

(6) Siegfried 1982, TN of 0.2 mg/l; TP of 0.010 mg/l as measured by isobutanol extraction.

(7) Current year's data.

A number of ratios have now been developed and are of interest when trying to present a clearer picture of current lake status (Table 2). A ratio for available N:TP in the range of 5:1 to 6:1 is found in Lake George and at these levels nitrogen fixing blue green algae may dominate (Schelske 1975, Schindler 1977). In a study of lakes from around the world blue green algae were found to dominate when the TN:TP ratio fell below 29:1 (Smith 1983). The available data (Table 2) indicates that the ratio for Lake George is somewhere between 20:1 and 40:1. At the experimental lakes in the Precamberian Shield of Canada (similar in geology to the Adirondacks) when ratios of TN:TP were in excess of 14:1 diatoms dominated over blue green algae (Schindler 1977). If the TN:TP ratio of Lake George is significantly less than those suggested by Schindler (1977) or Smith (1983) it could result that blue green algae be favored over diatoms.

Silica is an essential nutrient for the growth of diatoms. A ratio of silica to total phosphorus (Si:TP) in the range of 28:1 to 140:1 (Schelske 1975) permits good diatom growth whereas a Si:TP ratios less than 28:1 results in a switch from diatoms to blue green and green algae (at least in Lake Michigan, Schelske 1975). In the case of Lake Michigan, absolute concentrations of silica were below those currently found in Lake George. Si:TP ratios in Lake George during the summer range from 23:1 to 27:1, thus favoring phytoplankton which do not utilize silica however the levels of silica are in excess of those representing an absolute limitation to diatom growth (Schelske et al. 1972).

As in past years, a definite sodium gradient was found in the lake, (Figure 13) and as in the past has been attributed to road deicing activities (Lipka and Aulenbach, 1976, Villamil and Kent, 1980).

Chlorophyll a values remain very low with spring diatom blooms resulting in higher concentrations than those found during the summer months (Figure 14,15). The low chlorophyll a concentrations reported for Northwest Bay 0-2 m are probably due to the unfavorable nutrient levels and higher pheophytin concentrations (which indicate an unhealthy phytoplankton population). During the summer lower chlorophyll a concentration at the Northwest Bay 0-10 m site than at other Northwest Bay sites is contrary to that expected from the observed trends in nutrient concentrations.

CONCLUSIONS

1. The water quality of the epilimnion of Lake George has remained generally unchanged from that seen during the last 3 years. Transient decreases in water clarity may be the result of unusual events during the spring and early summer.
2. Increased nutrient levels in certain hypolimnion (deep water) samples indicate that a gradual change in epilimnion water quality may have taken place; however it has not yet become detectable in the epilimnion.
3. The ratios of nitrogen to phosphorus and phosphorus to silica suggests that the lake is in a condition such that a substantial change could occur if the nutrient ratios were to become altered either by nutrient addition or by a lowering of the nitrate content. Elevated nutrient levels are already present in the hypolimnion of the lake.
4. Streams in the basin especially those important to smelt reproduction should be monitored for their pH and alkalinity on a routine basis when heavy rainfalls occur during spring spawning. If the situation indicates depressed pH, an interruption in smelth spawning may occur requiring remedial action in the future to insure a forage base for salmonids.

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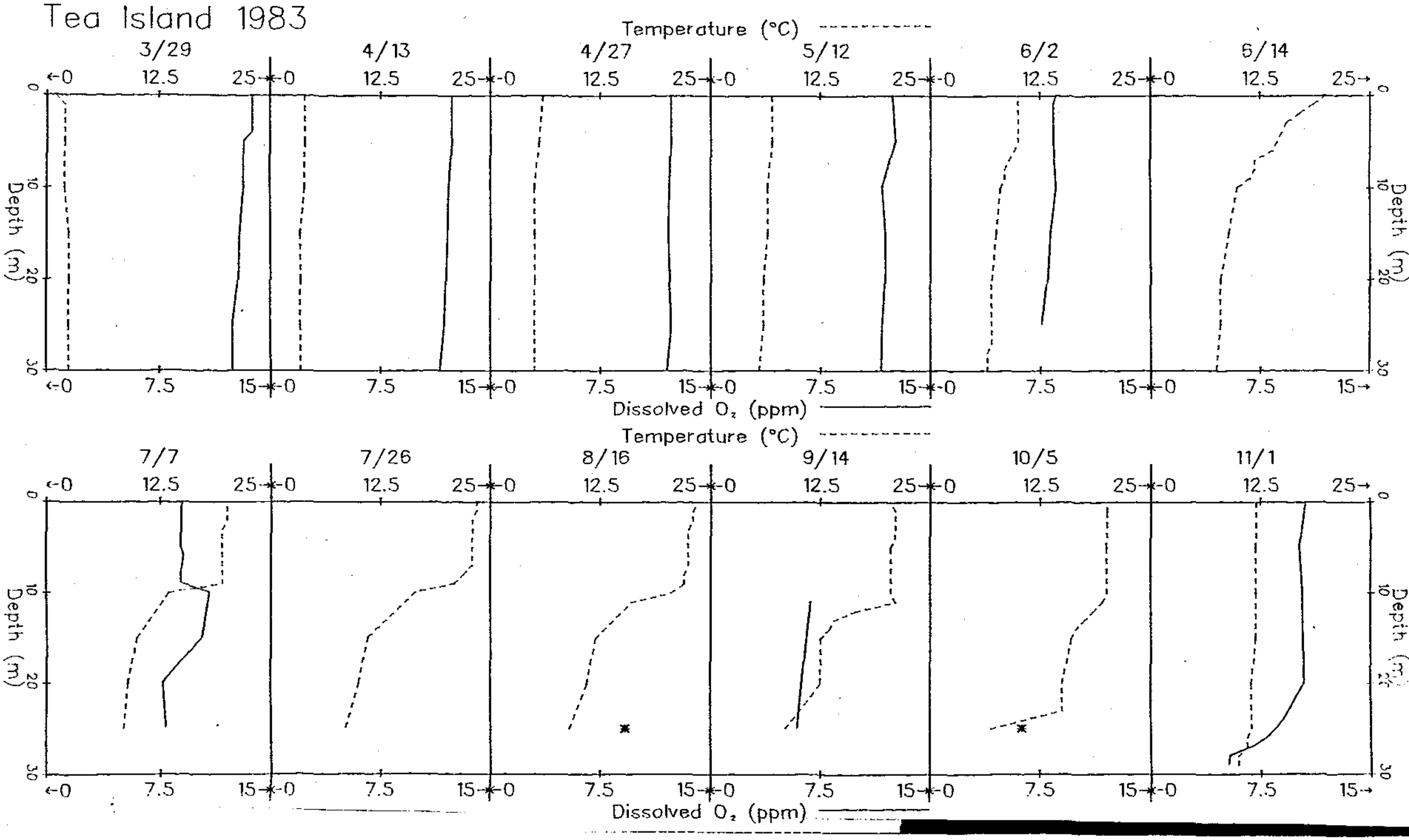
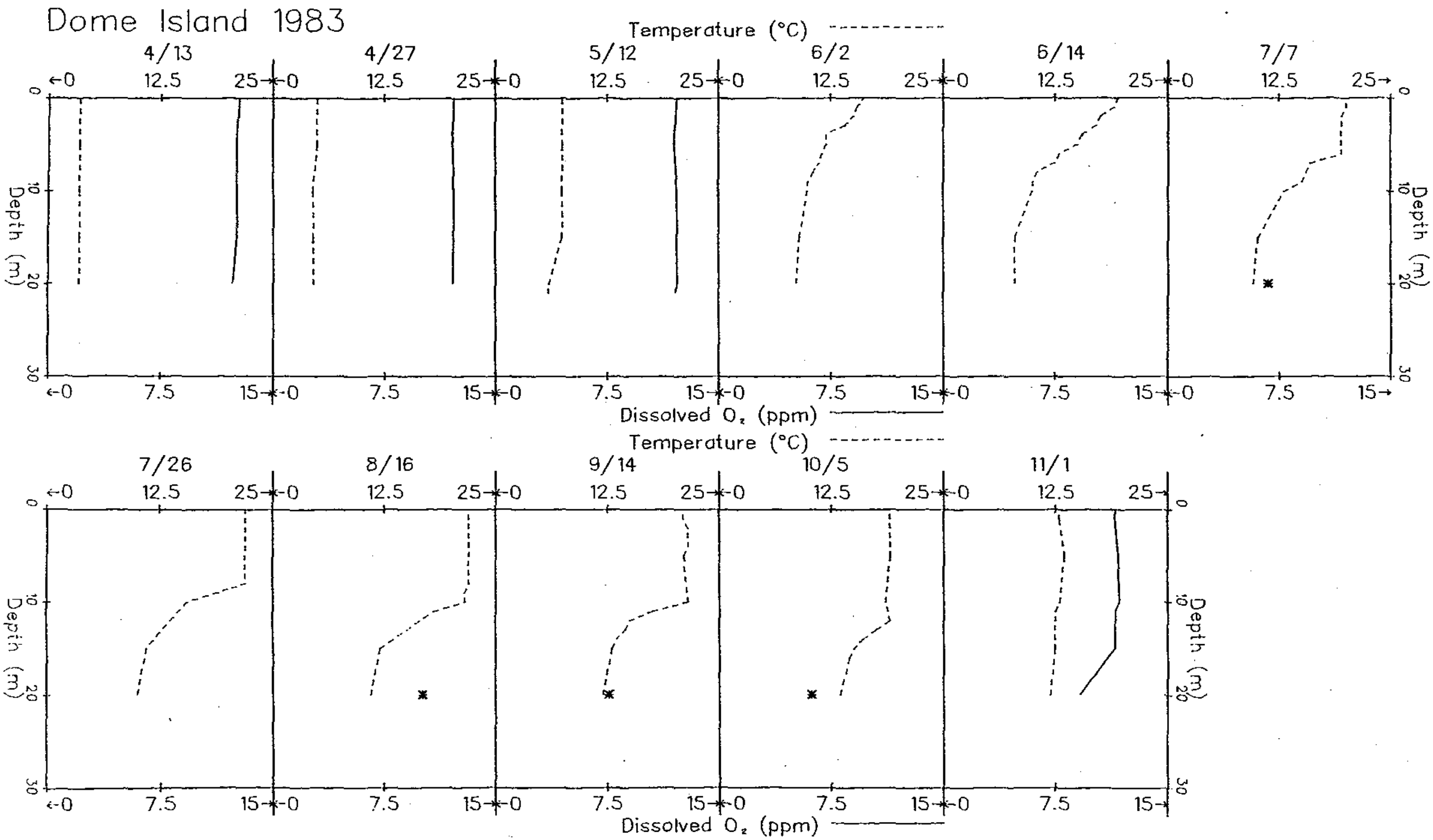
APPENDIX 1a. Dissolved Oxygen (D.O.)/Temperature °C profile at Tea Island 1983

* = Winkler Azide D.O. Value D.O. ± 1.0 T°C ± 1.0



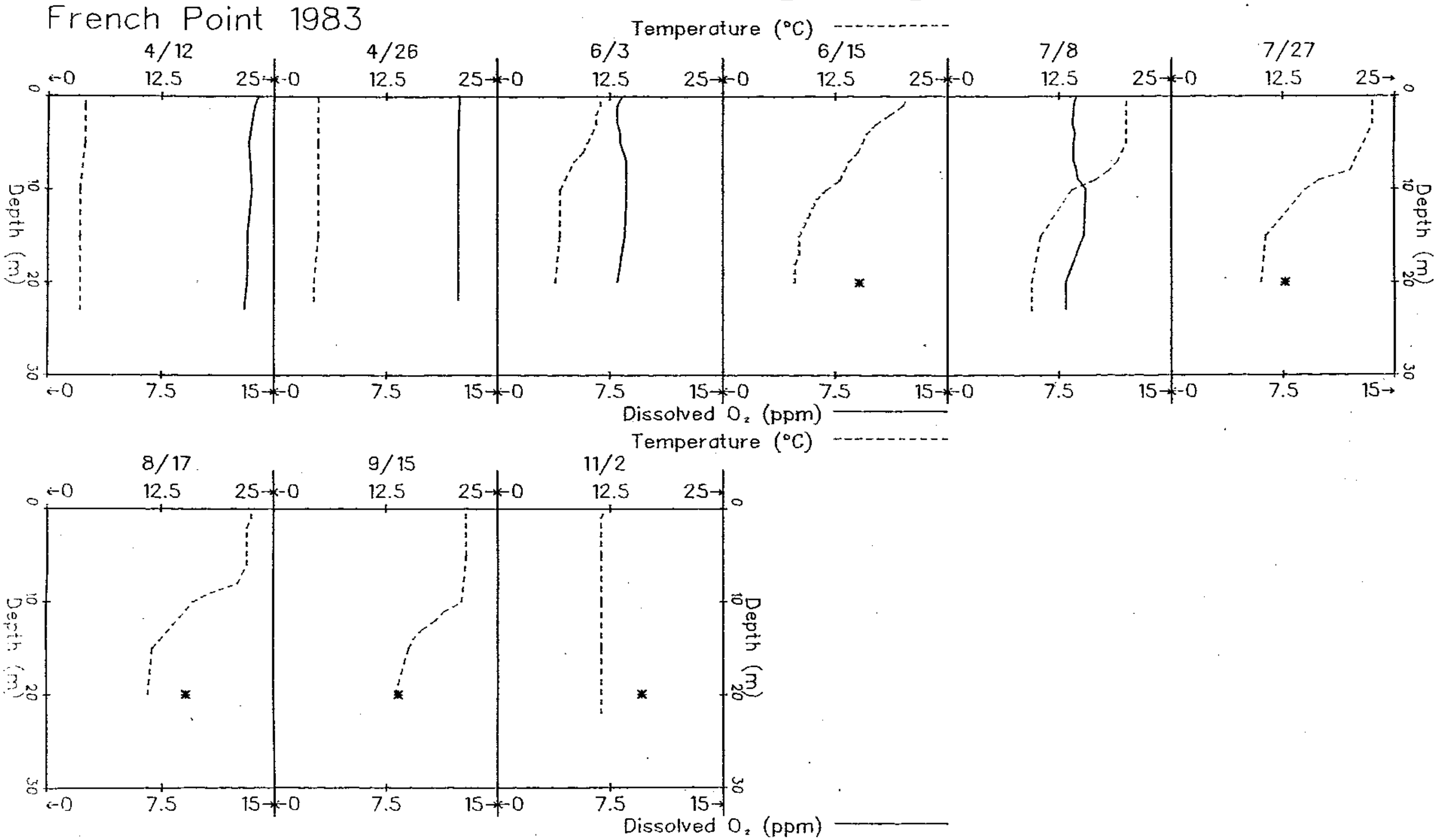
APPENDIX 1b. Dissolved Oxygen (D.O.)/Temperature °C Profile at Dome Island 1983

* = Winkler Azide D.O. Value D.O. ± 1.0 & T°C ± 1.0



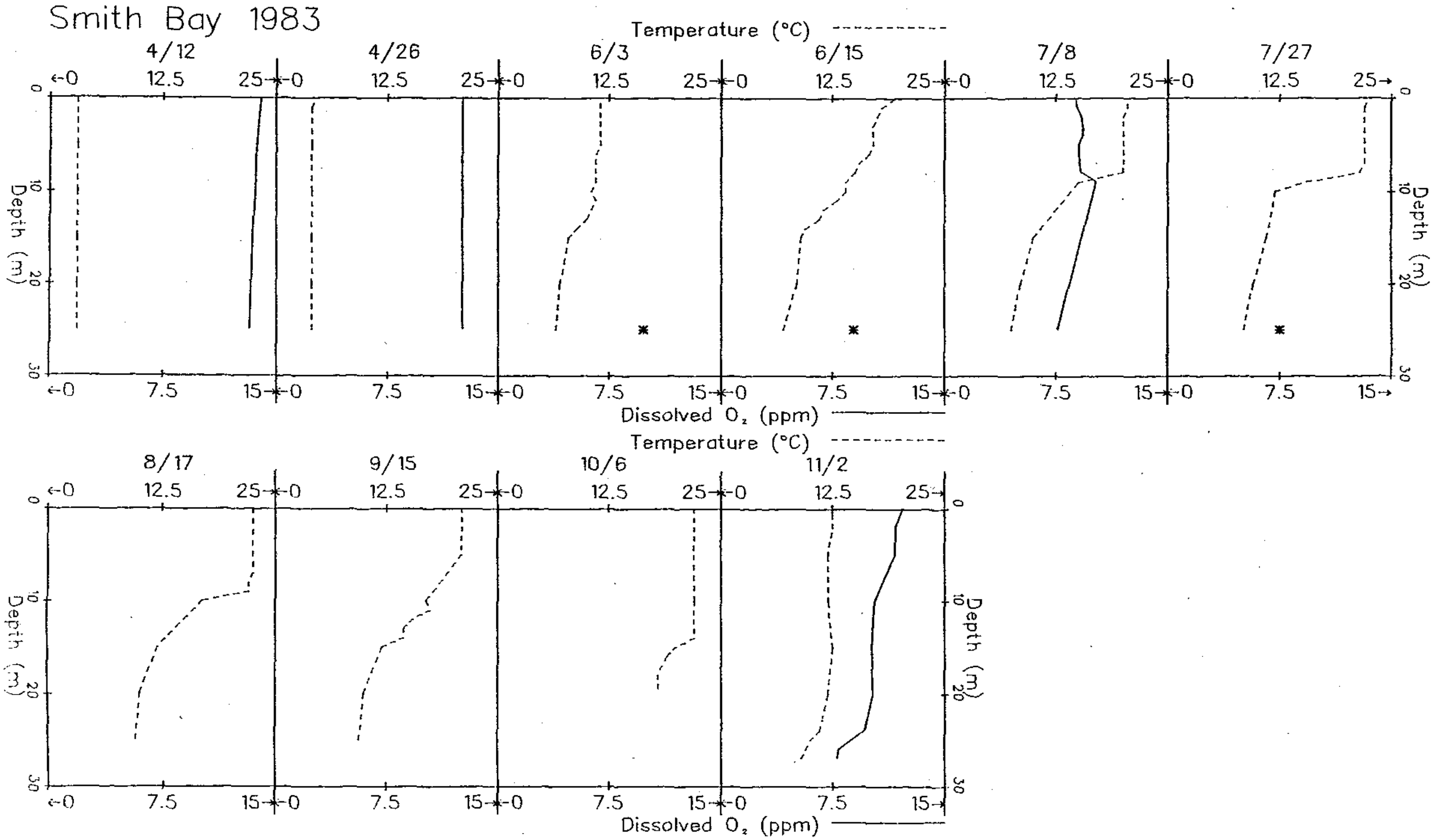
APPENDIX 1c. Dissolved Oxygen (D.O.)/Temperature at French Point 1983

* = Winkler Azide D.O. Value D.O. ± 1.0 and T°C ± 1.0



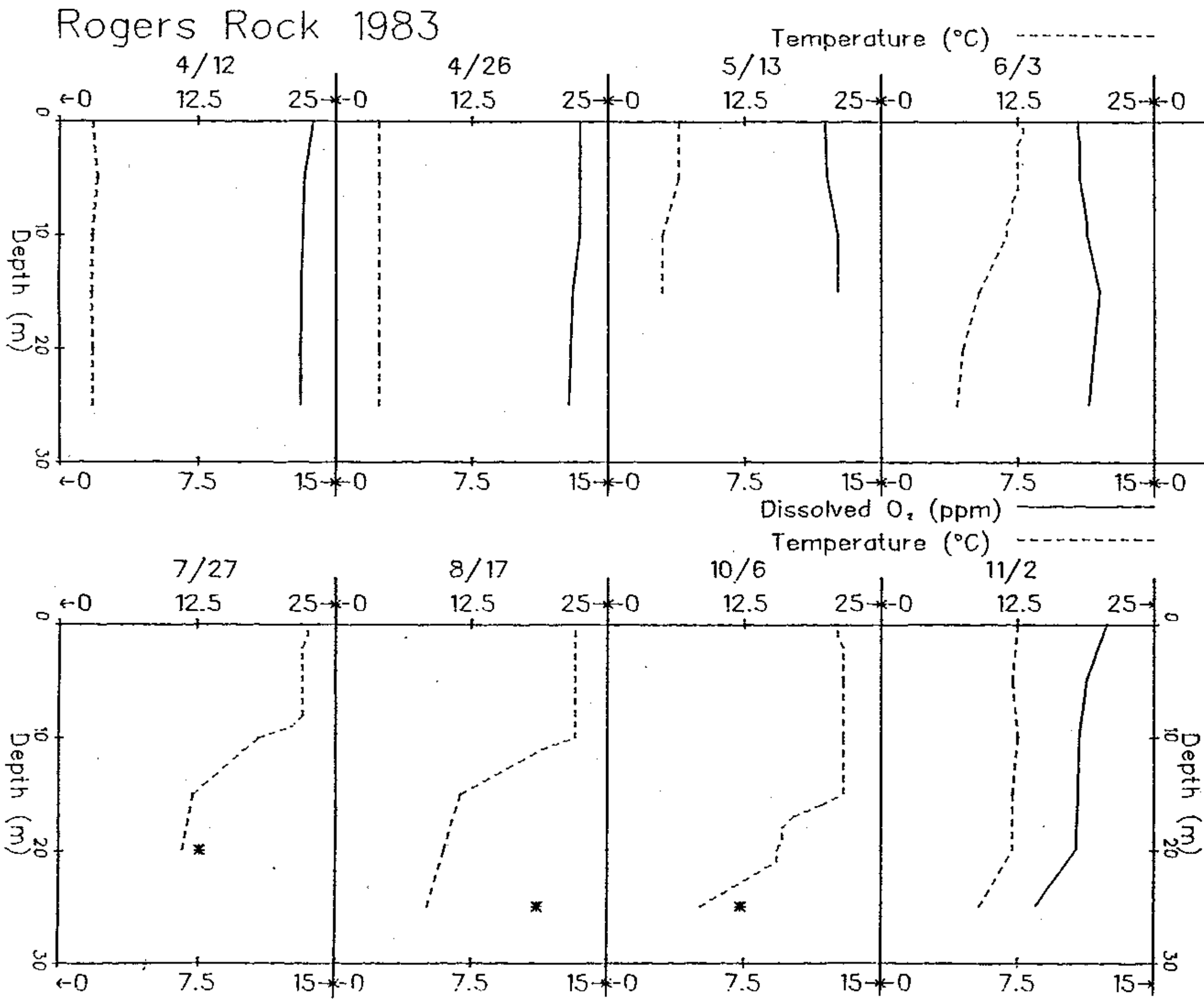
APPENDIX 1d. Dissolved Oxygen (D.O.)/Temperature Profile at Smith Bay 1983

* = Winkler Azide D.O. Value D.O. ± 1.0 and T°C ± 1.0



APPENDIX 1e. Dissolved Oxygen (D.O.)/Temperature Profile at Rogers Rock 1983

* = Winkler Azide D.O. Value D.O. ± 1.0 and T°C ± 1.0



APPENDIX 2

pH Electrode Method US EPA 1979 150.1

SD ± 0.05

1983

pH

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	7.30	7.30	7.25	7.25	7.10	7.30	7.30	7.20	7.55	7.55	7.60	7.35
Tea Island	0-10	7.40	7.30	7.35	7.40	7.25	7.35	7.15	7.40	7.65	7.65	-----	7.35
	>25	7.30	7.15	7.35	7.35	7.20	7.10	6.80	7.10	7.40	6.90	6.80	7.15
Harris Bay	0- 2	-----	7.35	-----	7.30	7.45	7.30	7.10	7.40	7.50	7.60	7.50	7.45
	0- 5	-----	7.40	7.45	7.40	7.35	7.50	7.30	7.10	7.65	7.60	7.55	7.45
Warner Bay	0- 2	-----	7.05	7.00	7.20	7.10	7.45	7.20	7.15	7.55	7.40	7.35	7.35
	0- 5	-----	7.35	7.35	7.45	7.20	7.40	7.30	7.15	7.20	7.50	7.55	7.45
Dome Island	0-10	-----	7.40	7.45	7.40	7.40	7.45	7.40	7.30	7.55	7.65	7.65	7.35
	>20	-----	7.45	7.40	7.40	7.35	7.40	7.20	7.00	7.30	7.00	7.00	7.35
Northwest Bay	0- 2	-----	6.95	6.90	7.15	7.00	7.10	7.20	7.70	7.50	7.70	-----	7.35
	0- 5	-----	7.15	7.20	7.35	7.30	7.05	7.50	7.65	7.50	7.80	-----	7.35
	0-10	-----	-----	7.45	7.40	7.10	7.20	7.35	7.35	7.65	7.70	7.55	7.35
French Point	0-10	-----	7.30	7.30	-----	7.40	7.25	7.50	7.80	7.60	7.75	7.55	7.40
	>20	-----	7.35	7.35	-----	7.15	7.15	7.10	7.35	7.25	7.05	6.95	7.40
Hueletts Landing	0- 3	-----	7.30	7.20	7.45	7.10	7.45	7.40	7.65	7.30	7.75	7.55	7.40
Smith Bay	0-10	-----	7.35	7.50	-----	7.20	7.50	7.00	7.30	7.75	7.75	7.70	7.40
	>25	-----	7.40	7.50	-----	7.25	7.50	7.00	7.20	7.25	7.15	7.05	7.20
Hague	0- 5	-----	7.35	7.45	7.50	7.25	7.50	7.30	7.80	7.50	7.70	7.70	7.40
Rogers Rock	0-10	-----	7.40	7.40	7.45	7.25	7.35	7.30	7.75	7.50	7.75	7.70	7.40
	>25	-----	7.35	7.40	-----	7.10	7.30	7.15	7.60	7.30	7.15	7.25	7.15
Hearts Bay	0- 2	-----	7.40	7.45	7.50	7.25	7.40	7.30	7.20	7.40	7.70	7.25	7.50

----- : indicates no data available

APPENDIX 3

Conductivity (umhos) at 25°C US EPA 1979 120.1

SD $\pm$ 1.0

1983

Conductivity (umhos)

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	94.3	99.1	97.9	97.1	106.2	119.0	111.5	106.6	94.8	101.4	99.2	103.7
Tea Island	0-10	98.1	96.0	100.0	96.0	96.8	100.6	107.9	105.4	94.5	98.1	-----	102.5
	>25	97.1	94.9	100.0	97.1	103.3	109.0	106.6	101.7	95.4	98.0	97.1	102.5
Harris Bay	0- 2	-----	97.9	-----	87.0	106.1	101.9	105.3	101.7	95.0	100.3	97.1	99.1
	0- 5	-----	92.8	97.9	94.9	106.2	98.2	106.8	101.7	93.4	100.3	97.1	101.4
Warner Bay	0- 2	-----	84.4	78.3	82.0	94.6	99.4	105.5	102.9	96.1	100.3	97.1	104.8
	0- 5	-----	89.6	93.5	88.0	101.6	99.4	107.5	102.9	94.2	98.0	97.1	102.5
Dome Island	0-10	-----	93.9	97.9	88.0	105.6	99.4	106.6	100.5	94.0	98.0	92.8	102.5
	>20	-----	94.9	97.9	88.0	108.8	101.9	109.3	99.3	92.8	96.1	91.7	101.4
Northwest Bay	0- 2	-----	59.1	54.4	85.3	63.9	90.4	99.0	104.4	90.6	93.1	-----	102.7
	0- 5	-----	78.0	79.4	97.7	84.7	97.5	100.4	100.9	90.7	94.1	-----	101.5
	0-10	-----	-----	93.5	97.7	89.0	98.6	98.1	101.2	90.6	93.1	98.1	100.4
French Point	0-10	-----	91.4	102.0	-----	90.8	99.9	98.1	101.0	90.9	93.1	98.1	99.3
	>20	-----	92.5	102.8	-----	94.2	103.0	99.2	101.7	90.6	93.1	98.1	101.6
Hueletts Landing	0- 3	-----	90.3	77.1	98.8	82.5	104.9	98.1	102.0	90.6	93.1	100.3	103.9
Smith Bay	0-10	-----	93.6	101.7	-----	77.8	101.3	100.4	101.5	90.8	93.1	98.1	101.6
	>25	-----	93.6	105.2	-----	96.1	102.5	99.2	102.0	91.8	93.1	100.3	100.4
Hague	0- 5	-----	95.7	100.5	101.0	91.8	102.5	96.9	102.0	90.9	93.1	99.2	100.4
Rogers Rock	0-10	-----	96.8	105.2	101.0	81.3	102.0	68.4	102.1	91.0	93.1	99.2	101.6
	>25	-----	95.7	105.2	-----	84.9	104.0	100.4	101.5	92.6	93.1	99.2	100.4
Hearts Bay	0- 2	-----	96.8	107.5	95.4	94.9	105.0	104.9	103.2	91.1	93.1	99.2	100.4

----- : indicates no data available

APPENDIX 4

Chloride mg/l Ferricyanide Method US EPA 1979 325.2

SD ± 0.1 mg/l, Detection Limit (D.L.) 0.01 mg/l

1983

Cl (mg/l)

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	-----	8.50	-----	6.50	8.30	-----	7.10	7.20	7.40	6.80	7.00	7.20
Tea Island	0-10	-----	7.30	7.00	6.70	6.00	6.90	6.70	7.10	6.80	6.90	-----	6.90
	>25	8.10	-----	6.80	6.80	7.80	6.60	6.60	6.80	7.70	6.30	6.40	6.60
Harris Bay	0- 2	-----	6.20	-----	6.30	7.30	6.40	6.50	6.60	6.70	6.50	6.10	6.70
	0- 5	-----	6.90	6.80	6.90	6.30	6.70	6.90	6.50	6.90	6.50	6.50	6.50
Warner Bay	0- 2	-----	6.40	4.70	6.00	5.40	6.90	6.90	6.70	6.70	7.10	7.20	6.80
	0- 5	-----	6.50	5.90	6.40	6.70	6.80	6.40	6.40	6.60	6.60	6.80	6.70
Dome Island	0-10	-----	6.60	6.40	10.60	6.40	-----	6.40	6.40	6.50	-----	6.70	13.40
	>20	-----	-----	6.40	-----	6.20	7.00	6.40	6.60	6.60	6.60	7.20	7.40
Northwest Bay	0- 2	-----	5.10	-----	5.70	3.90	5.60	6.60	6.50	6.00	6.20	-----	6.60
	0- 5	-----	5.40	7.20	6.40	5.80	6.20	6.20	7.30	6.00	6.50	-----	6.30
	0-10	-----	6.30	6.40	6.50	6.10	6.10	-----	6.60	6.00	6.40	6.70	6.20
French Point	0-10	-----	6.40	6.00	-----	6.00	6.20	6.90	-----	5.90	6.20	6.70	6.20
	>20	-----	6.20	6.30	-----	6.20	6.10	6.60	6.70	6.40	6.30	6.50	6.40
Hueletts Landing	0- 3	-----	5.70	4.10	6.20	6.10	5.60	6.10	6.40	-----	6.20	6.60	6.20
Smith Bay	0-10	-----	6.10	6.10	-----	6.60	6.20	6.10	6.00	6.40	6.10	6.40	6.20
	>25	-----	6.10	5.90	-----	6.50	6.10	6.30	10.40	6.00	5.90	6.30	5.90
Hague	0- 5	-----	6.40	6.00	7.40	6.20	6.20	6.00	6.40	6.50	6.10	6.50	6.00
Rogers Rock	0-10	-----	6.30	6.10	6.60	6.10	5.90	4.70	6.40	6.20	6.70	6.80	7.20
	>25	-----	6.00	6.40	-----	6.40	6.10	6.20	7.40	6.80	6.00	7.10	6.10
Hearts Bay	0- 2	-----	7.20	6.40	-----	8.00	6.30	-----	6.50	7.50	11.60	26.80	15.40

----- : indicates no data available

APPENDIX 5

Nitrate mg/l Cadmium Reduction US EPA 1979 353.2

SD ± 0.01, D.L. 0.01 mg/l

1983

NO3 (mg/l)

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	0.050	0.030	-----	0.010	0.020	<.010	<.010	<.010	<.010	<.010	<.010	-----
Tea Island	0-10	0.040	0.030	<.010	0.010	<.010	0.020	<.010	<.010	<.010	<.010	-----	<.010
	>25	0.050	0.030	0.020	<.010	0.020	<.010	0.010	<.010	0.010	0.030	0.010	<.010
Harris Bay	0- 2	-----	<.010	-----	<.010	<.010	0.010	<.010	<.010	<.010	0.010	<.010	<.010
	0- 5	-----	<.010	0.020	0.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010
Warner Bay	0- 2	-----	<.010	0.010	<.010	<.010	<.010	<.010	<.010	-----	<.010	0.050	<.010
	0- 5	-----	0.010	0.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010
Dome Island	0-10	-----	0.010	0.010	0.010	<.010	<.010	0.010	<.010	<.010	<.010	<.010	<.010
	>20	-----	0.020	<.010	0.020	0.010	0.030	0.030	<.010	0.010	0.020	0.020	<.010
Northwest Bay	0- 2	-----	0.100	0.070	0.010	0.020	0.030	<.010	<.010	<.010	<.010	-----	<.010
	0- 5	-----	0.050	0.030	0.010	<.010	<.010	<.010	<.010	<.010	<.010	-----	<.010
	0-10	-----	0.030	0.020	0.010	<.010	0.020	<.010	<.010	-----	<.010	<.010	<.010
French Point	0-10	-----	<.010	<.010	-----	<.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010
	>20	-----	<.010	<.010	-----	<.010	0.020	0.020	<.010	<.010	<.010	<.010	<.010
Hueletts Landing	0- 3	-----	<.010	0.040	<.010	<.010	0.020	<.010	<.010	<.010	<.010	<.010	<.010
Smith Bay	0-10	-----	0.020	0.010	-----	<.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010
	>25	-----	0.010	0.010	-----	0.020	0.010	0.020	0.020	<.010	<.010	<.010	0.010
Hague	0- 5	-----	0.020	0.030	0.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010
Rogers Rock	0-10	-----	0.010	0.020	0.020	<.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010
	>25	-----	0.010	0.010	0.010	0.020	<.010	0.010	<.010	<.010	<.010	<.010	<.010
Hearts Bay	0- 2	-----	0.020	0.020	0.010	<.010	<.010	<.010	<.010	0.010	<.010	<.010	<.010

----- : indicates no data available

APPENDIX 6

Ammonia mg/1 Alkaline phenol US EPA 1979 350.1

SD ± 0.02 mg/1, D.L. 0.01 mg/1

1983

NH_4 (mg/l)

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	0.010	<.010	-----	<.010	<.010	0.060	0.010	<.010	<.010	<.010	<.010	-----
Tea Island	0-10	0.010	<.010	<.010	<.010	<.010	0.030	<.010	<.010	0.020	0.030	-----	0.010
	>25	0.020	<.010	0.030	<.010	<.010	0.020	<.010	<.010	0.040	<.010	0.030	<.010
Harris Bay	0- 2	-----	0.050	-----	<.010	<.010	0.010	<.010	<.010	0.090	0.010	<.010	<.010
	0- 5	-----	<.010	<.010	0.490	<.010	<.010	0.010	<.010	0.030	0.010	0.010	<.010
Warner Bay	0- 2	-----	<.010	0.020	-----	<.010	<.010	<.010	<.010	-----	<.010	<.010	0.010
	0- 5	-----	<.010	0.030	<.010	<.010	<.010	0.040	0.020	0.060	<.010	<.010	<.010
Dome Island	0-10	-----	<.010	0.020	<.010	<.010	0.050	0.030	<.010	0.061	0.050	0.010	0.010
	>20	-----	<.010	0.010	<.010	<.010	<.010	0.110	<.010	0.060	0.010	<.010	<.010
Northwest Bay	0- 2	-----	<.010	0.010	<.010	<.010	<.010	0.060	<.010	<.010	0.040	-----	<.010
	0- 5	-----	<.010	<.010	<.010	<.010	<.010	0.010	<.010	0.030	<.010	-----	<.010
	0-10	-----	<.010	0.060	<.010	0.010	<.010	0.020	0.030	-----	<.010	<.010	<.010
French Point	0-10	-----	<.010	<.010	-----	0.030	0.040	<.010	<.010	0.030	<.010	<.010	<.010
	>20	-----	<.010	<.010	-----	<.010	0.020	0.050	<.010	0.030	<.010	0.010	<.010
Hueletts Landing	0- 3	-----	<.040	0.020	<.010	<.010	<.010	<.010	<.010	0.050	0.010	<.010	<.010
Smith Bay	0-10	-----	<.010	<.010	-----	<.010	0.100	0.030	<.010	0.090	<.010	<.010	<.010
	>25	-----	<.010	<.010	-----	0.030	0.030	0.050	0.010	0.010	<.010	0.020	<.010
Hague	0- 5	-----	<.010	<.010	<.010	<.010	<.010	0.030	<.010	0.060	<.010	<.010	<.010
Rogers Rock	0-10	-----	<.010	<.010	0.010	<.010	<.010	0.110	<.010	0.050	<.010	<.010	<.010
	>25	-----	<.010	<.010	0.040	<.010	<.010	0.020	<.010	0.060	<.010	<.010	<.010
Hearts Bay	0- 2	-----	0.040	<.010	0.030	<.010	<.010	<.010	0.020	0.130	<.010	0.010	0.010

----- : indicates no data available

APPENDIX 7

Soluble Reactive Silica Molybdate Reaction, Strickland and Parson, 1972

SD $\pm$ 0.05 overfull range 0.5 - 4.0, D.L. 0.10 mg/l

1983

Si (mg/l)

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	2.000	1.700	-----	1.500	1.950	-----	1.000	1.000	1.050	1.000	1.250	1.650
Tea Island	0-10	1.800	1.700	1.600	1.500	1.500	-----	1.050	0.950	0.950	1.150	-----	1.550
	>25	1.750	-----	1.550	1.500	1.500	-----	1.500	1.800	1.200	1.650	1.800	1.600
Harris Bay	0- 2	-----	1.350	-----	1.350	1.450	1.250	1.150	1.150	1.000	1.150	1.200	1.400
	0- 5	-----	1.400	1.350	1.500	1.350	1.400	1.000	1.000	1.250	1.150	1.150	1.450
Warner Bay	0- 2	-----	2.350	2.650	2.000	2.600	1.350	1.150	1.200	1.250	1.050	1.000	1.400
	0- 5	-----	1.800	1.850	1.500	0.850	1.400	1.050	1.050	1.050	1.200	1.200	1.400
Dome Island	0-10	-----	1.400	1.450	1.450	1.400	1.450	1.100	0.950	0.850	0.900	1.150	1.650
	>20	-----	1.500	1.350	-----	1.500	1.550	1.400	1.500	1.200	1.600	1.750	1.550
Northwest Bay	0- 2	-----	3.650	-----	2.250	3.450	2.500	1.050	0.900	1.350	0.950	-----	1.700
	0- 5	-----	1.850	2.150	1.600	1.800	1.600	1.050	0.850	2.600	1.000	-----	1.600
	0-10	-----	-----	1.600	1.550	1.550	1.300	1.350	0.950	0.900	1.050	1.200	1.700
French Point	0-10	-----	1.400	1.450	-----	1.350	1.250	1.000	0.950	0.900	0.950	1.150	1.550
	>20	-----	1.400	1.400	-----	1.400	1.450	1.400	1.350	1.450	1.650	1.800	1.600
Hueletts Landing	0- 3	-----	1.750	3.100	1.300	1.450	1.900	1.100	0.950	-----	1.100	1.150	1.700
Smith Bay	0-10	-----	1.500	1.650	-----	1.350	1.300	1.100	1.000	0.900	1.000	1.100	1.250
	>25	-----	1.500	1.650	-----	1.500	1.350	1.550	1.500	1.250	1.450	1.600	-----
Hague	0- 5	-----	1.550	2.000	1.600	1.450	1.250	1.000	1.000	0.950	1.050	1.150	-----
Rogers Rock	0-10	-----	1.500	1.500	1.400	1.400	1.150	0.750	0.950	0.900	1.000	1.300	1.150
	>25	-----	1.600	1.600	1.350	1.250	1.450	1.300	1.200	1.300	1.550	1.100	1.550
Hearts Bay	0- 2	-----	1.500	1.450	1.350	1.300	1.200	1.100	1.000	-----	0.400	-----	1.200

----- : indicates no data available

APPENDIX 8

Total Phosphorus Single Reagent Ascorbic Acid Molybdate, Strickland and Parson, 1972

SD ± 0.00062 mg/l or 0.62 ug/l over full range 1-20 ug/l, D.L. 0.001 mg/l or 1.0 ug/l

1983 Total phosphorus (mg/l)

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	-----	0.004	0.004	0.004	0.005	0.004	0.005	0.003	0.004	0.004	0.005	0.004
Tea Island	0-10	-----	0.003	0.004	0.005	0.004	0.005	0.005	0.005	0.004	0.004	-----	0.004
	>25	-----	0.004	0.003	0.006	0.012	0.009	0.005	0.017	0.008	0.007	0.007	0.007
Harris Bay	0- 2	-----	0.004	-----	0.005	0.006	0.003	0.005	0.005	0.005	0.004	0.004	0.003
	0- 5	-----	0.003	0.004	0.004	0.005	0.004	0.004	-----	0.004	0.004	-----	0.006
Warner Bay	0- 2	-----	0.008	0.006	0.008	0.010	0.008	0.010	0.008	0.008	0.006	0.006	0.006
	0- 5	-----	0.004	0.004	0.004	0.004	0.005	0.005	0.004	0.004	0.006	0.004	0.006
Dome Island	0-10	-----	0.003	0.004	0.004	0.003	0.004	0.004	0.004	0.003	0.003	0.004	0.005
	>20	-----	0.006	0.006	0.008	0.008	0.012	0.013	0.005	0.012	0.007	0.010	0.008
Northwest Bay	0- 2	-----	0.003	0.003	0.004	0.005	0.010	0.005	0.005	0.004	0.004	-----	0.006
	0- 5	-----	0.003	0.005	0.004	0.003	-----	0.004	0.004	0.004	0.003	-----	0.004
	0-10	-----	0.005	0.004	0.004	0.004	0.013	0.005	0.005	0.005	0.004	0.004	0.004
French Point	0-10	-----	0.005	0.004	-----	0.003	0.011	0.004	0.004	0.004	0.004	0.003	0.005
	>20	-----	0.006	0.007	-----	0.005	0.006	0.020	0.007	0.007	0.007	0.006	0.005
Hueletts Landing	0- 3	-----	0.004	0.005	0.003	0.003	0.012	-----	0.005	0.004	0.004	0.004	0.006
Smith Bay	0-10	-----	0.005	0.004	-----	0.012	0.012	-----	0.005	0.003	0.003	0.005	0.005
	>25	-----	0.006	0.005	-----	0.005	0.005	-----	0.006	0.006	0.006	0.003	0.008
Hague	0- 5	-----	0.004	0.004	0.003	0.003	-----	-----	0.004	0.005	0.003	0.002	0.003
Rogers Rock	0-10	-----	0.003	0.004	0.003	0.004	-----	-----	0.006	<.001	0.002	0.010	0.004
	>25	-----	0.006	0.008	-----	0.007	0.007	-----	0.019	0.004	0.008	0.002	0.007
Hearts Bay	0- 2	-----	0.003	0.004	0.004	0.004	-----	-----	0.005	0.001	0.003	0.004	0.004

----- : indicates no data available

APPENDIX 9

Total Filterable Phosphorus Single Reagent Ascorbic Acid Molybdate, Strickland and Parson, 1972

SD ± 0.00062 mg/l or 0.62 ug/l, D.L. 0.001 mg/l or 1.0 ug/l

1983 Total filtered phosphate (mg/l)

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	-----	0.001	0.001	0.001	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.002
Tea Island	0-10	-----	0.001	0.001	0.002	0.002	0.002	0.002	0.004	0.002	0.002	-----	0.001
	>25	-----	<.001	0.002	0.006	0.007	0.006	0.003	0.008	0.004	0.003	0.003	0.004
Harris Bay	0- 2	-----	0.001	-----	0.002	0.003	0.002	0.003	0.005	0.002	0.001	-----	0.001
	0- 5	-----	0.002	0.001	0.002	0.002	0.002	0.002	0.004	0.003	0.002	-----	0.002
Warner Bay	0- 2	-----	0.003	0.003	0.003	0.005	0.003	0.004	0.007	0.004	0.003	0.002	0.002
	0- 5	-----	0.002	0.002	0.002	0.003	0.002	0.004	0.004	0.002	0.002	0.001	0.001
Dome Island	0-10	-----	0.002	0.001	0.001	0.002	0.002	0.003	0.004	0.002	0.002	0.002	-----
	>20	-----	0.005	0.004	0.008	0.004	0.006	0.007	-----	0.007	0.004	-----	0.008
Northwest Bay	0- 2	-----	0.003	0.002	0.001	0.003	0.010	0.004	0.002	0.002	0.001	-----	0.001
	0- 5	-----	0.002	0.002	<.001	0.002	-----	0.002	0.003	0.002	<.001	-----	0.001
	0-10	-----	0.001	0.001	<.001	0.002	0.013	-----	0.003	0.003	0.001	<.001	0.001
French Point	0-10	-----	0.002	0.001	-----	0.002	0.011	0.003	-----	0.002	0.001	<.001	0.002
	>20	-----	0.002	0.003	-----	0.003	0.002	0.050	0.007	0.002	0.002	<.001	0.001
Hueletts Landing	0- 3	-----	0.002	0.002	<.001	0.002	0.012	-----	0.005	0.002	0.001	0.001	0.001
Smith Bay	0-10	-----	0.002	0.002	-----	0.002	0.012	-----	0.002	0.002	<.001	0.001	<.001
	>25	-----	0.003	0.004	-----	0.004	0.003	-----	-----	0.004	0.004	0.002	0.006
Hague	0- 5	-----	0.002	0.002	<.001	0.002	-----	-----	0.003	<.001	0.001	<.001	<.001
Rogers Rock	0-10	-----	0.002	0.002	0.001	0.002	-----	-----	0.005	<.001	<.001	0.003	0.001
	>25	-----	0.006	0.006	-----	0.004	0.003	-----	0.008	0.001	0.004	0.001	0.004
Hearts Bay	0- 2	-----	0.002	0.002	<.001	0.001	-----	-----	0.004	<.001	<.001	0.001	0.001

----- : indicates no data available

APPENDIX 10

Orthophosphate or Molybdate Reactive Phosphate, Strickland and Parson, 1972

SD ± 0.0006 mg/l or 0.6 ug/l, D.L. 0.001 mg/l or 1.0 ug/l

1983

Orthophosphate (mg/l)

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	-----	-----	0.001	-----	-----	<.001	-----	0.002	-----	-----	<.001	-----
Tea Island	0-10	-----	<.001	0.002	0.001	-----	<.001	0.001	0.001	-----	<.001	-----	-----
	>25	-----	<.001	0.001	<.001	-----	<.001	0.001	0.002	-----	-----	0.001	-----
Harris Bay	0- 2	-----	<.001	-----	0.001	-----	-----	0.001	0.001	-----	-----	<.001	-----
	0- 5	-----	<.001	-----	<.001	-----	-----	<.001	0.001	-----	-----	<.001	-----
Warner Bay	0- 2	-----	0.002	0.002	0.001	-----	0.001	0.001	0.002	-----	-----	<.001	-----
	0- 5	-----	0.002	0.002	0.001	-----	<.001	0.001	0.001	-----	-----	<.001	-----
Dome Island	0-10	-----	<.001	-----	<.001	-----	<.001	0.001	<.001	-----	-----	<.001	-----
	>20	-----	<.001	0.001	0.001	-----	<.001	0.002	0.001	-----	-----	0.001	-----
Northwest Bay	0- 2	-----	0.001	-----	<.001	-----	<.001	0.002	-----	0.001	-----	-----	-----
	0- 5	-----	<.001	-----	<.001	-----	<.001	0.001	-----	0.001	-----	-----	-----
	0-10	-----	<.001	-----	0.001	-----	<.001	<.001	-----	0.001	-----	-----	-----
French Point	0-10	-----	<.001	-----	-----	-----	<.001	0.001	0.002	0.001	-----	<.001	-----
	>20	-----	0.001	0.001	-----	-----	<.001	0.004	0.003	0.001	-----	<.001	-----
Hueletts Landing	0- 3	-----	0.002	0.002	<.001	-----	0.001	<.001	<.001	<.001	-----	-----	-----
Smith Bay	0-10	-----	<.001	<.001	-----	-----	<.001	<.001	0.001	<.001	-----	<.001	-----
	>25	-----	<.001	0.001	-----	-----	<.001	<.001	0.002	0.002	-----	<.001	-----
Hague	0- 5	-----	<.001	-----	<.001	-----	0.006	<.001	0.001	<.001	-----	<.001	-----
Rogers Rock	0-10	-----	<.001	<.001	<.001	-----	<.001	-----	0.002	<.001	-----	<.001	-----
	>25	-----	<.001	-----	-----	-----	<.001	0.001	0.002	-----	-----	<.001	-----
Hearts Bay	0- 2	-----	<.001	0.001	<.001	-----	<.001	0.001	-----	<.001	-----	<.001	-----

----- : indicates no data available

APPENDIX 11

Sodium Flame Atomic Absorption US EPA 1979 273.3

SD ± 0.1 mg/1, D.L. 0.1 mg/1

1983

Na (mg/l)

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	4.90	5.00	4.55	4.15	4.90	-----	4.20	4.35	4.50	4.15	4.25	4.30
Tea Island	0-10	4.60	4.50	4.35	4.20	4.00	4.05	-----	4.10	4.15	4.00	-----	4.00
	>25	4.50	4.65	4.25	4.25	4.10	4.00	4.00	4.00	4.20	5.00	3.90	4.10
Harris Bay	0- 2	-----	4.00	-----	3.95	4.00	4.00	3.95	3.90	4.00	4.10	3.95	3.95
	0- 5	-----	4.20	4.10	4.15	4.05	4.00	4.00	3.90	3.95	3.95	4.05	3.90
Warner Bay	0- 2	-----	3.90	3.30	-----	3.70	3.90	4.00	3.95	4.05	4.10	-----	4.10
	0- 5	-----	3.95	3.75	3.95	3.85	3.90	4.30	4.00	4.00	4.00	3.95	4.00
Dome Island	0-10	-----	4.05	4.10	3.95	3.85	3.80	3.90	3.95	3.85	3.95	4.05	4.00
	>20	-----	4.10	3.95	3.90	3.90	3.90	3.85	3.85	3.95	3.80	3.85	-----
Northwest Bay	0- 2	-----	2.70	2.00	3.95	2.65	3.55	3.95	3.90	3.90	3.90	-----	4.00
	0- 5	-----	3.50	3.25	3.50	3.75	3.70	3.80	3.85	3.90	3.90	-----	3.90
	0-10	-----	3.95	3.85	3.85	3.70	3.75	3.85	3.85	3.90	3.95	3.85	4.00
French Point	0-10	-----	3.90	3.80	-----	3.90	3.65	3.85	3.80	3.80	3.85	3.85	-----
	>20	-----	3.95	3.95	-----	3.70	3.70	3.85	3.80	-----	3.85	3.70	3.80
Hueletts Landing	0- 3	-----	3.50	2.50	3.85	3.65	3.65	3.70	3.80	3.85	3.70	3.80	-----
Smith Bay	0-10	-----	3.75	3.70	-----	3.70	6.70	3.70	3.65	3.70	3.80	3.60	3.70
	>25	-----	3.85	-----	-----	3.60	3.65	3.70	3.70	3.75	2.95	3.70	3.70
Hague	0- 5	-----	3.80	3.75	3.80	3.65	3.65	3.70	3.75	3.70	3.75	3.70	3.70
Rogers Rock	0-10	-----	3.80	4.70	3.70	3.90	3.60	3.70	3.75	4.15	3.70	3.60	3.80
	>25	-----	3.90	3.65	-----	3.65	3.65	3.60	3.75	3.65	3.60	3.70	3.70
Hearts Bay	0- 2	-----	3.75	3.75	3.65	3.10	3.70	3.65	3.75	3.75	3.75	3.70	3.80

----- : indicates no data available

APPENDIX 12

Chlorophyll a Monochromatic Spectrophotometric, Strickland and Parson, 1972

SD ± 0.10 ug/l, D.L. 0.05 ug/l

1983

Chl-a (ppb)

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	1.70	-----	1.45	1.70	1.80	0.55	0.25	0.60	1.65	1.20	1.30	1.10
Tea Island	0-10	2.00	-----	0.80	2.10	2.50	0.95	1.45	0.70	1.90	1.20	-----	1.30
	>25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Harris Bay	0- 2	-----	1.10	-----	2.50	2.70	0.85	1.00	0.95	1.45	1.05	1.20	0.40
	0- 5	-----	-----	1.40	2.00	1.95	1.00	1.20	0.45	1.50	0.0	0.95	0.95
Warner Bay	0- 2	-----	-----	1.25	2.10	2.25	1.80	11.00	1.25	0.75	1.45	2.10	0.75
	0- 5	-----	-----	2.10	2.60	2.50	1.30	1.80	1.30	1.10	1.25	1.30	0.60
Dome Island	0-10	-----	-----	1.95	1.60	1.85	0.65	1.05	1.00	0.60	1.00	0.85	-----
	>20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Northwest Bay	0- 2	-----	-----	0.05	1.20	1.10	1.40	0.55	1.10	0.90	1.30	-----	0.20
	0- 5	-----	-----	1.70	1.70	1.25	1.10	0.50	0.90	1.10	1.30	-----	0.40
	0-10	-----	-----	2.05	1.95	1.40	0.60	0.75	0.40	1.20	0.05	0.95	0.40
French Point	0-10	-----	1.80	2.35	-----	1.80	0.95	0.65	0.70	0.55	0.20	1.00	0.30
	>20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Hueletts Landing	0- 3	-----	1.60	-----	1.05	1.10	0.95	0.55	0.60	0.80	0.50	1.40	1.30
Smith Bay	0-10	-----	1.50	0.40	-----	1.10	0.95	0.65	0.75	1.00	0.70	0.85	0.20
	>25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Hague	0- 5	-----	0.90	-----	1.45	0.95	1.20	0.50	0.85	0.10	0.65	0.95	0.25
Rogers Rock	0-10	-----	0.10	-----	1.50	0.80	1.00	-----	1.00	0.70	0.50	0.75	0.25
	>25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Hearts Bay	0- 2	-----	1.00	-----	1.40	0.90	0.30	0.55	0.65	0.50	0.70	0.90	0.20

----- : indicates no data available

APPENDIX 13

Pheophytin Monochromatic Spectrophotometric, Strickland and Parson, 1972

SD ± 0.10 ug/l, D.L. 0.05 ug/l

1983

PHEO (ppb)

Site	Depth	3/29	4/12 -4/13	4/26 -4/27	5/12 -5/13	6/2 -6/3	6/14 -6/15	7/7 -7/8	7/26 -7/27	8/16 -8/17	9/14 -9/15	10/5 -10/6	11/1 -11/2
Lake George Vil.	0- 2	0.70	-----	0.40	0.70	0.45	0.0	2.50	1.00	0.60	0.20	0.40	0.20
Tea Island	0-10	1.15	-----	0.05	0.40	1.10	0.05	0.20	1.10	1.15	0.30	-----	0.30
	>25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Harris Bay	0- 2	-----	1.85	-----	0.50	0.95	0.10	1.20	0.45	0.55	0.70	0.40	0.0
	0- 5	-----	-----	1.40	0.0	0.65	0.05	0.95	0.90	0.50	2.60	0.50	0.0
Warner Bay	0- 2	-----	-----	0.65	1.20	0.65	0.20	<.05	0.50	0.60	0.60	1.10	0.15
	0- 5	-----	-----	0.65	0.75	1.10	0.0	0.60	0.60	0.70	0.60	0.30	0.0
Dome Island	0-10	-----	-----	0.80	0.70	0.60	0.0	0.90	0.40	1.20	0.30	0.45	-----
	>20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Northwest Bay	0- 2	-----	-----	0.35	0.40	0.50	0.55	1.50	0.40	0.45	0.60	-----	0.10
	0- 5	-----	-----	0.05	0.30	0.35	0.0	0.50	0.40	0.40	0.05	-----	0.0
	0-10	-----	-----	0.75	0.55	0.95	0.40	0.55	0.80	0.40	1.40	0.0	0.0
French Point	0-10	-----	0.60	0.50	-----	0.60	0.0	0.55	0.30	1.80	1.50	0.25	0.0
	>20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Hueletts Landing	0- 3	-----	0.0	-----	1.70	0.05	0.15	0.35	0.35	0.80	2.30	0.65	0.0
Smith Bay	0-10	-----	0.40	1.50	-----	0.20	0.15	0.50	0.40	0.05	0.20	0.30	0.05
	>25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Hague	0- 5	-----	0.05	-----	0.35	0.0	0.0	0.70	0.50	1.40	0.60	0.20	0.05
Rogers Rock	0-10	-----	2.20	-----	0.20	0.20	0.10	-----	0.35	0.25	0.50	0.30	0.0
	>25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Hearts Bay	0- 2	-----	0.20	-----	0.30	0.25	1.35	0.40	0.65	0.65	0.40	0.25	0.15

----- : indicates no data available