FINAL REPORT

on

THE LAKE GEORGE INSHORE CHEMICAL MONITORING PROGRAM

Submitted to
The Lake George Association Fund

by

Eichler, L. W. and C. W. Boylen
Renssealer Fresh Water Institute
Rensselaer Polytechnic Institute
Troy, NY 12180-3590

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EXECUTIVE SUMMARY

The Inshore Chemical Monitoring Program was instituted in 1986 and designed to evaluate near-shore water quality and quantify the effects of various land uses on near-shore water chemistry. Sampling locations were selected to be representative of predominant land uses in the basin; including areas with high human population density, high density commercial usage, marina operations, and little or no human impact.

Results from this initial season of sampling indicate slightly higher levels of orthophosphorus and total phosphorus than found at offshore sites. Soluble silica concentrations were less at inshore sites while other nutrient levels (nitrogeneous compounds) were comparable to offshore levels. Whether differences in nutrient levels are due to resuspension from the sediments in the shallow water areas where the sampling sites are found or increased impact from terrestrial runoff is not known at the present time. Efforts to determine sources for various types of nutrients and to better quantify the impact of various land uses will be necessary in future programs. The means to better evaluate sources of nutrients and their impacts will involve additional sampling locations and some precipitation event based sampling efforts.

INTRODUCTION

The source of the elevated levels of nutrients in the South basin of Lake George has been the subject of a number of studies (Gibble, 1974; Ferris and Clesceri, 1975; Aulenbach, 1979; Wood and Fuhs, 1979; Sutherland et al, 1983; and Dillon, 1983). Although estimates vary on the precise amounts of nutrient loading from a variety of sources, all investigators agree that atmospheric deposition (rain, snow, and dryfall) and surface runoff are the major sources of nitrogen and phosphorus to the lake. The Lake George Chemical Monitoring Program was instituted in 1980 to document any long term changes in nutrient dynamics. The six years of data collection indicate stable levels of the principle plant nutrients (nitrogen and phosphorus) in the open waters of the lake. Low levels of dissolved oxygen in the deeper water of the south basin over the last few years however, may be a signal of impending change. This observation, coupled with results from the Coliform Monitoring Program, strongly suggests the need for more intensive study of the inshore waters to detect changes in nutrient levels at an earlier stage.

During the winter of 1985 - 1986, data generated by the Lake George Chemical and Coliform Monitoring Programs over the last six years was reviewed to assess the ability of these programs to monitor and protect the "health" of Lake George. Although it was determined that long-term goals will be met by the scope of the present programs, there was a desire to document the short-term chemical effects of human activities (e.g., nutrient additions such as nitrogen, silica and phosphorus) along the lake shore; to compliment the last three years of coliform data collected by the Fresh Water Institute (FWI, 1984; 1985; 1986). These discussions resulted in the formulation of a near-shore chemical monitoring effort.

The Inshore Chemical Monitoring Program was instituted in 1986 and designed to evaluate near-shore water quality and quantify the effects of various land uses on near-shore water chemistry. Sampling locations were selected to be representative of predominant land uses in the basin; including areas with high human population density, high density commercial usage, marina operations, and little or no human impact. Samples were collected in water depths of one meter or less to maximize the ability to detect shoreline inputs and reduce the effects of dilution. Although precipitation "event" based sampling is generally considered a more effective method for observing rapid changes in nutrient concentrations associated with surface runoff, fixed time interval sampling was used in this program. Event based sampling required a much larger committment of staff and equipment than was available during the summer of 1986. Event based sampling, at least on a small scale, may be used in future years if deemed appropriate.

The results of the first seasons testing form the basis for this report.

SAMPLING SITES AND METHODS

Eight sampling sites were selected to be representative of predominant land uses in the basin; including areas with high human population density, high density commercial usage, marina operations, and little or no human impact. The sites are characterized as to adjacent land use, and a description of each site is included (Table 1 and Figure 1).

At each site, two stations were established; one where the water depth was 0.5 meters and the second where the depth was 1.0 meter. Where possible, sampling sites were located in areas adjacent to the open water sites used in the Lake George Chemical Monitoring Program (FWI, 1986). Sites were sampled biweekly from July 21 through October 29, 1986. At each site, surface grab samples were collected for analysis of a variety of chemical constituents.

Sample preparation and analytical techniques have been discussed at length in previous reports (FWI, 1986). A list of analytical techniques employed in this study is included as Appendix 1.

Table 1. Sampling Site Names and Locations.

Site Name	Type	Location
Lake George Village	C,HD	Situated on the west shore, 25 meters south of the southern end of Shepard's Park Beach, in the Town of Lake George.
Harris Bay	R, HD MARINA	On the east shore of Harris Bay, 30 meters northwest of the point where Boathouse Rd. meets the lake in the Town of Queensbury.
Sandy Bay	R, HD	On the east shore of Sandy Bay, 200 meters north of the junction of Rockhurst Road and the lake in the Town of Queensbury.
Warner Bay	R, HD MARINA	On the west shore of Warner Bay, 500 from the mouth of the wetland. Adjacent to a marina operation in the Town of Queensbury.
Bolton Landing	C, HD MARINA	On the west shore of Bolton Bay, 250 meters south of the Green Island Bridge. Adjacent to a marina operation in the Town of Bolton.
Northwest Bay	U	On the east shore of Northwest Bay, just south of Fan Point. A protected bay receiving surface water drainage from a forested watershed in the Town of Bolton.
South Huletts Landing	U	A small bay on the east shore of the lake, at the north end of the Narrows midway between Saint Sacrement Island and the Harbor Group of Islands in the Town of Dresden.
Huletts Landing	R, HD	On the east shore of Sunset (Pickerel) Bay, 100 meters north of the Washington County Beach. There are two small streams tributary to the bay adjacent to the beach in the Town of Dresden.

R = Residential; C = Commercial; HD = High Density; U = Undeveloped

RESULTS

Precipitation records from the FAA station at the Glens Falls Airport are included as Figure 2.* The sampling period of this study, July through October 1986, had higher than average precipitation in July followed by less than average precipitation in August and September.

The pH results for all inshore samples were near neutral (pH = 7). Values ranged from a low of 6.68 at the Harris Bay 0.5 m site to a high of 7.86 found at both the Harris Bay 0.5 m site and the Bolton 0.5 m site (Table 2 and Figure 3) . The Harris Bay 0.5 m sites also exhibited the greatest range of pH (6.68 - 7.86). The average pH values for inshore sampling sites were not substantially different from those reported for adjacent offshore sites.

Conductivity results ranged from 93 to 128 umhos (Table 3). The sites at Lake George Village (0.5 and 1.0 m) consistently displayed the highest conductivity values (means of 109.8 and 107.3 umhos, respectively). Conductivity values were generally higher at sites in the south basin than comparable sites in the north basin (Figure 4). Marina sites generally had higher conductivity. The conductance of samples from inshore sites relative to samples from comparable offshore sites was variable. Large differences, however were not observed.

Chloride concentrations were highest at the Lake George Village

* All Figures are included as Appendix 2. All Tables are included as Appendix 3.

sites (range 7.8 - 9.7 ppm Cl). Lowest chloride concentrations (range 6.7 - 7.9 ppm Cl) were reported for the South Huletts Landing sites (Table 4). With the limited amount of data, site specific trends were not observable; however chloride concentrations follow a south to north trend in the basin, with highest concentrations reported in the south end and lowest in the north (Figure 5). This trend has been reported previously (FWI, 1981 - 1986).

Nitrate and ammonia concentrations (Tables 5 & 6) were routinely below the limit of detection for our laboratory (0.01 ppm as N). This condition is comparable to summer results for all offshore chemical monitoring sites.

Concentrations of Total Phosphorus (TP) were highest in the Warner Bay, Bolton Landing and Harris Bay sites (Table 7 and Figure 6). The TP concentrations reported for the inshore sites in Warner Bay were comparable to results from the midbay (0-2 m) site in the Chemical Monitoring Program. Inshore sampling sites in Harris Bay and Bolton Landing possessed TP concentrations which were slightly higher than comparable sites in deeper water. A single TP value of 19 ppb at the Bolton Landing 0.5 m site caused a large increase in the average concentration of TP, however removing this value only reduces the mean TP concentration at this site to 6.9 ppb. The mean TP concentration at the Bolton Landing 0-2 m site during the 1986 summer sampling season was 5.1 ppb. At the Harris Bay sites, the TP concentration in samples from the 1.0 m station (mean = 5.8 ppb) was comparable to those from the 0-2 m station (mean

= 5.7 ppb). TP concentrations at the 0.5 m station were somewhat higher (mean = 6.4 ppb). A wide range of TP was observed in inshore samples relative to offshore results for similar areas however, most 0.5 m sites had higher TP concentrations than either the associated 1 m sites or nearby deeper water sites (0-2 m or 0-3 m). The sites at South Huletts Landing (means = 3.4 ppb) had the lowest average TP concentrations. The 0.5 and 1.0 m sites in Huletts Landing also had relatively low concentrations of TP, with means of 4.5 and 3.3 ppb, respectively. The South Huletts Landing site is in an unpopulated area at the north end of the Narrows. The Huletts Landing station, however is located in a relatively densely populated area.

Total Filterable Phosphorus (TFP) concentrations were highest at the Lake George Village site (mean = 5.3 ppb), followed by the other sites in the south basin (Table 8). The relation of the inshore sites to comparable offshore sites was variable.

Orthophosphorus (OP) concentrations (Table 9) at all sites were near the detection limit of our laboratory (1.0 ppb as P). The mean concentration of OP was above 1.0 ppb at several sites however, including Harris Bay, Warner Bay, and the 0.5 m sites at Bolton Landing and Northwest Bay (Figure 7). The 0.5 m sites generally exhibited greater concentrations of OP than their associated 1.0 m sites. Those sites which had measureable OP concentrations contained more OP than comparable offshore sites. The need to analyse OP immediately after collection and its contamination prone nature lead to a limited amount of OP data being available. Thus any discussion of trends in OP concentrations is very speculative.

Concentrations of soluble reactive silica ranged from 0.30 to 1.05 ppm through the period of sampling, and were similar in the 0.5 and 1.0 m stations at each site (Table 10). Highest average silica concentrations were observed at the Lake George Village 0.5 and 1.0 m stations, 0.76 and 0.75 ppm respectively (Figure 8). Silica concentrations in inshore samples were generally less than in adjacent offshore sampling sites.

Calcium concentrations were variable between sites (Table 11). The greatest mean calcium concentration was found at the 0.5 m station at Bolton Landing. The 0.5 m stations generally had higher calcium concentrations than their related 1.0 m stations (Figure 9). Resuspension of calcium from the sediments by wave action, or runoff from adjacent terrestial areas may be the source.

Concentrations of chlorophyll a were highly variable both between and within sites (Table 12 and Figure 10). The low levels of chlorophyll a present in the samples (range <0.05 to 4.7 ppb) coupled with the variability of the data, makes any discussion of trends highly speculative.

DISCUSSION

Results from the first year of the Inshore Chemical Monitoring have provided the data necessary to evaluate site selection and sampling frequency. Site selection will have to be reviewed in light of the differences observed between sites with comparable levels of shoreline development but located in different basins of the Lake. Sites in the north basin have proven to be different, chemically, than comparable sites in the south basin. Thus basin effects may be an important aspect of the nutrient dynamics of inshore waters.

Sampling frequency appears to be adaquate however, a comparison of event based versus fixed interval sampling should be considered in future studies. Event based sampling is timed to precipitation or rapid snow melt episodes, when large amounts of runoff occur. Precipitation and runoff are major sources of nutrients to Lake George. Rapid changes in water chemistry of streams tributary to Lake George following precipitation events were observed in the NURP Program. These changes were generally of a short duration, indicating that they may not have been observed if a fixed interval sampling program was used. The same situation may occur in inshore waters of Lake George, perhaps dictating the need for event based sampling.

Results from the initial season of sampling indicate slightly higher levels of orthophosphorus and total phosphorus than found at offshore sites. Soluble silica concentrations were less at inshore sites while other nutrient levels (nitrogeneous compounds) were comparable to offshore levels. Whether differences in nutrient levels are due to resuspension from the sediments in the shallow water areas where the sampling sites are found or increased impact from terrestrial runoff is not known at the present time.

Silica is derived principally from erosion in the terrestial portion of the basin or resuspension from sediments on the lake bottom, thus higher levels would be expected nearshore. Soluble reactive silica concentrations at the inshore sampling sites however, were less than at nearby deeper water (0-2 m) locations. The principle mechanism for soluble silica removal from the water column is through incorporation into the frustules of diatoms. Whether the diatom populations of inshore waters, depths of 1 meter or less, are substantially different from those of adjacent deeper waters, depths of 2 meters or greater, was not a part of this study.

Total phosphorus (TP) and orthophosphorus (OP) concentrations in the nearshore samples were generally higher than in similar deeper water samples. This phenomena is not unexpected when it is realized than surface runoff and precipitation are two of the major sources of phosphorus to the lake. The limited amount of data however, makes it difficult to ascertain the differences attributable to the various land uses at each sampling site. Degree of shoreline development may be a major factor, however a somewhat different sampling approach may be necessary to determine the impact of various land uses.

The differences observed between sites with comparable land uses were as large as between sites with similar land uses. The principle differences between sites were related to the location of the sites within the two basins of Lake George. Most trends observed were comparable to those reported for the offshore monitoring sites reported previously, although nutrient concentrations were generally greater at inshore sites than at comparable deep water sites. Thus the conclusions of this sampling program largely support conclusions reported in the Offshore Chemical Monitoring Report (FWI, 1987).

A greater range in concentration of each of the ions tested was observed at the inshore sampling sites relative to adjacent deeper water locations. This phenomena was expected since previous investigators have reported large shifts in concentration of a number of ions in streams in relation to precipitation and surface runoff.

The results of this program indicate that new sampling sites may be necessary to reduce the impact of the differences between the two basins of Lake George, in order to distinguish the effects of various land uses on adjacent inshore water chemistry. In addition, some precipitation event based sampling may be necessary to observe short term changes in inshore water chemistry which may also be influenced by adjacent land uses.

ACKNOWLEDGMENTS

We wish to again thank the Lake George Association Fund for its financial support which makes the continuing study of the chemical water quality of Lake George possible. Thanks also go to the Lake George Association, its office staff, 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 better understand Lake George. Many thanks to all of you.

All samples obtained as part of this program were collected and analyzed by the Fresh Water Institute staff. Lawrence W. Eichler had responsibility for day to day on site operations of the program. He was aided in the data collection, analysis and report preparation by Reginald Soracco, Mary Anne Smith, Jan Witting, and Kathleen Regan. Daren Brown, Linda Samter and Julie LaGoy did much of the sampling and chemical analyses. Dr. Charles W. Boylen, Director of the FWI does, of course, have ultimate responsibility for the monitoring program and this report.

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APPENDIX 1

Analysis	Method	Instrument
pH	Electrometric (EPA Method 150.1)	Orion, Model 811
Specific Conductance	Wheatstone Bridge type meter (EPA Method 120.1)	YSI, Model 31
Dissolved Oxygen	Membrane Electrode (EPA Method 360.1)	YSI, Model 54
Chloride	Automated Ferricyanide (EPA Method 325.2)[1]	Technicon Autoanalyzer II
Nitrate	Automated Cadmium Reduction (EPA Method 353.2)[1]	Technicon Autoanalyzer II
Ammonia	Automated Phenate (EPA Method 350.1)	Technicon Autoanalyzer II
Total Phosphorus	Colorimetric (EPA Method 365.2)	Bausch & Lomb Spec 710
Total Filterable Phosphorus	Colorimetric (EPA Method 365.2)	Bausch & Lomb Spec 710
Ortho Phosphorus	Colorimetric (EPA Method 365.2)	Bausch & Lomb Spec 710
Calcium	Direct Aspiration (EPA Method 215.1)	Perkin-Elmer Model 403
Soluble Reactive Silica	Automated Molybdate (Technicon Method)	Technicon Autoanalyser II
Chlorophyll _a_	Methanol Extraction	Bausch & Lomb Spec 710

EPA Methods listed in this table are derived from: USEPA, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Cincinnati, OH.

APPENDIX 2

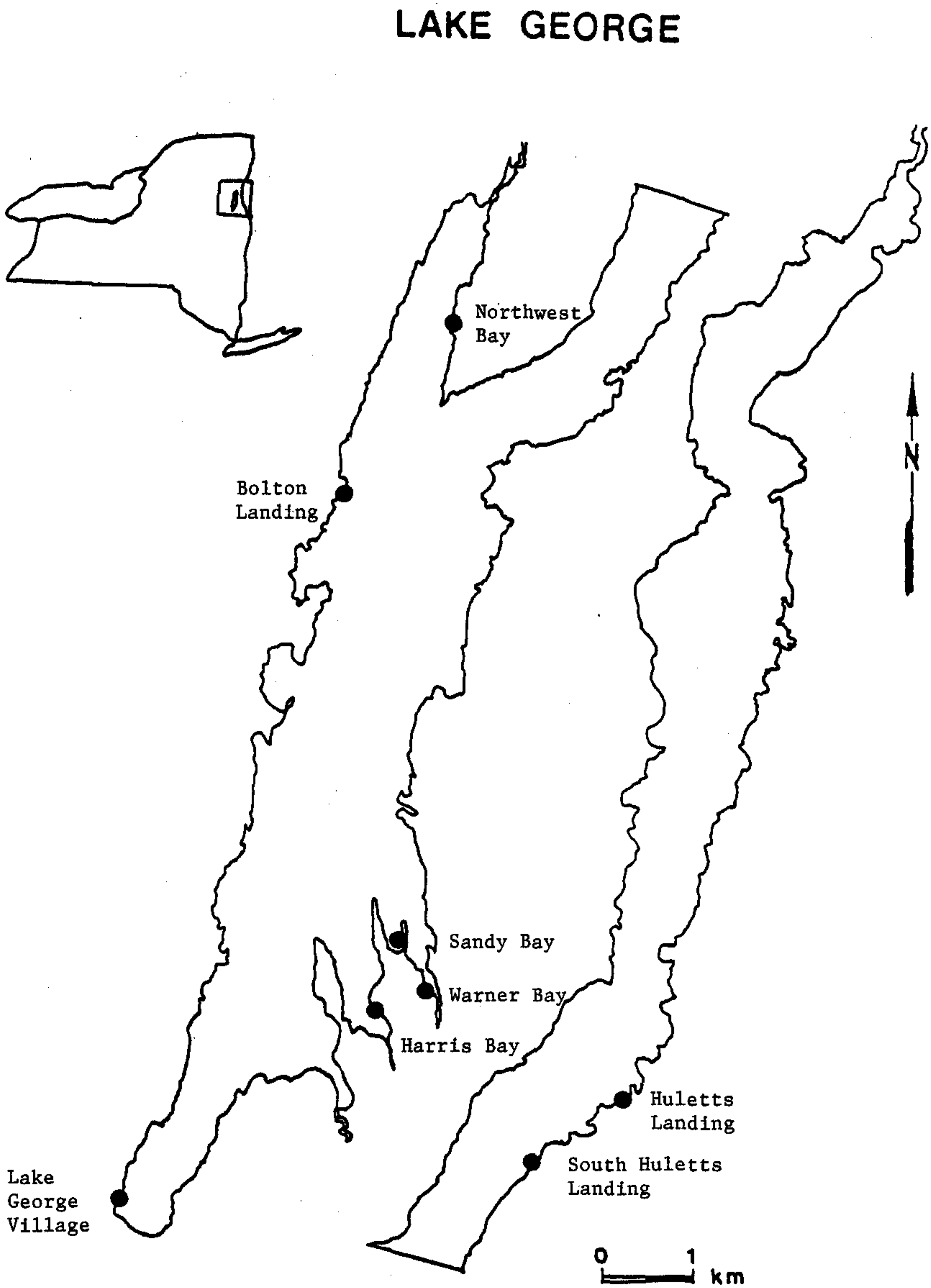

FIGURE 1: Site Locations on Lake George.

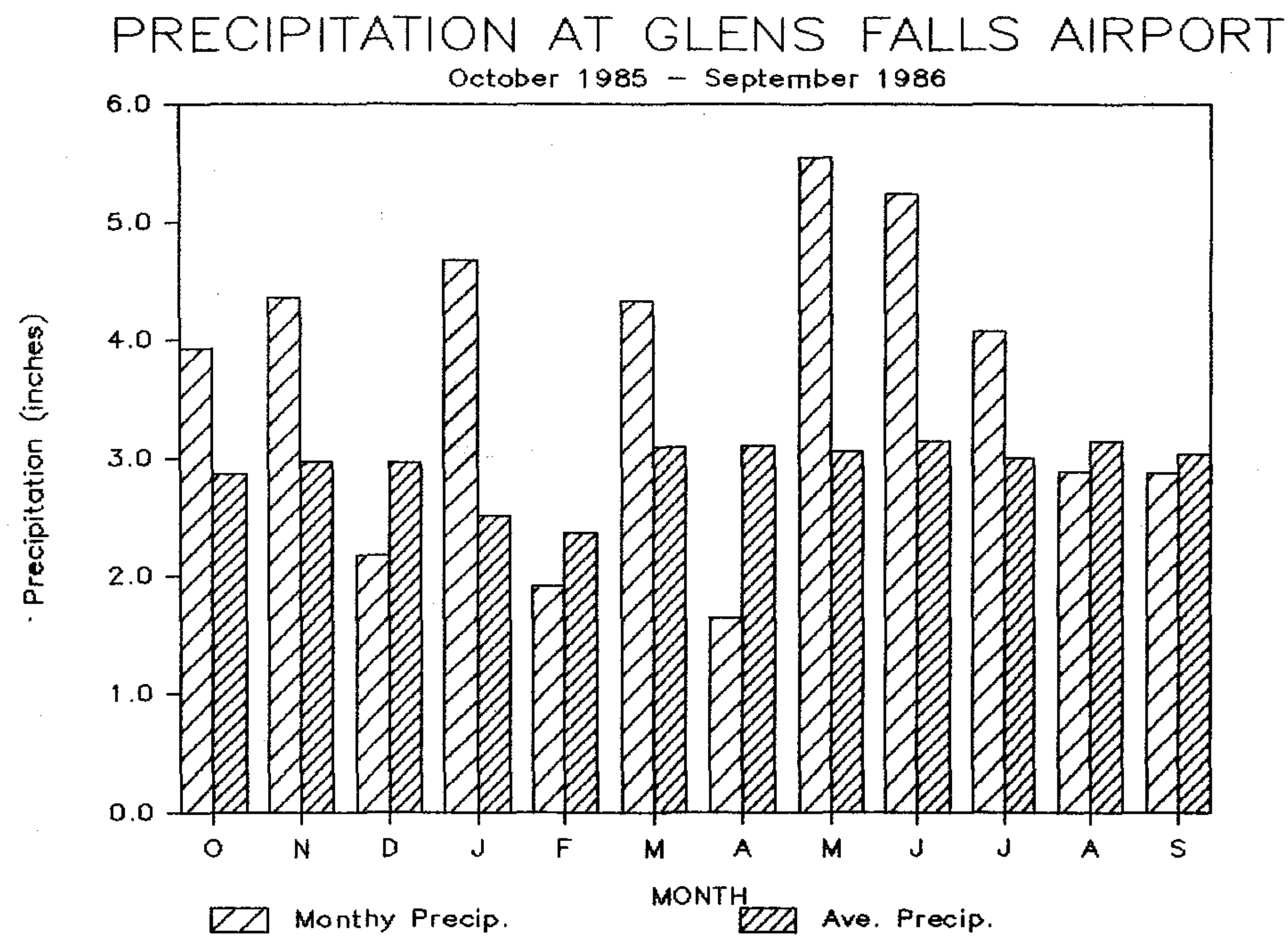

Figure 2. Site Locations at Glens Falls Airport.

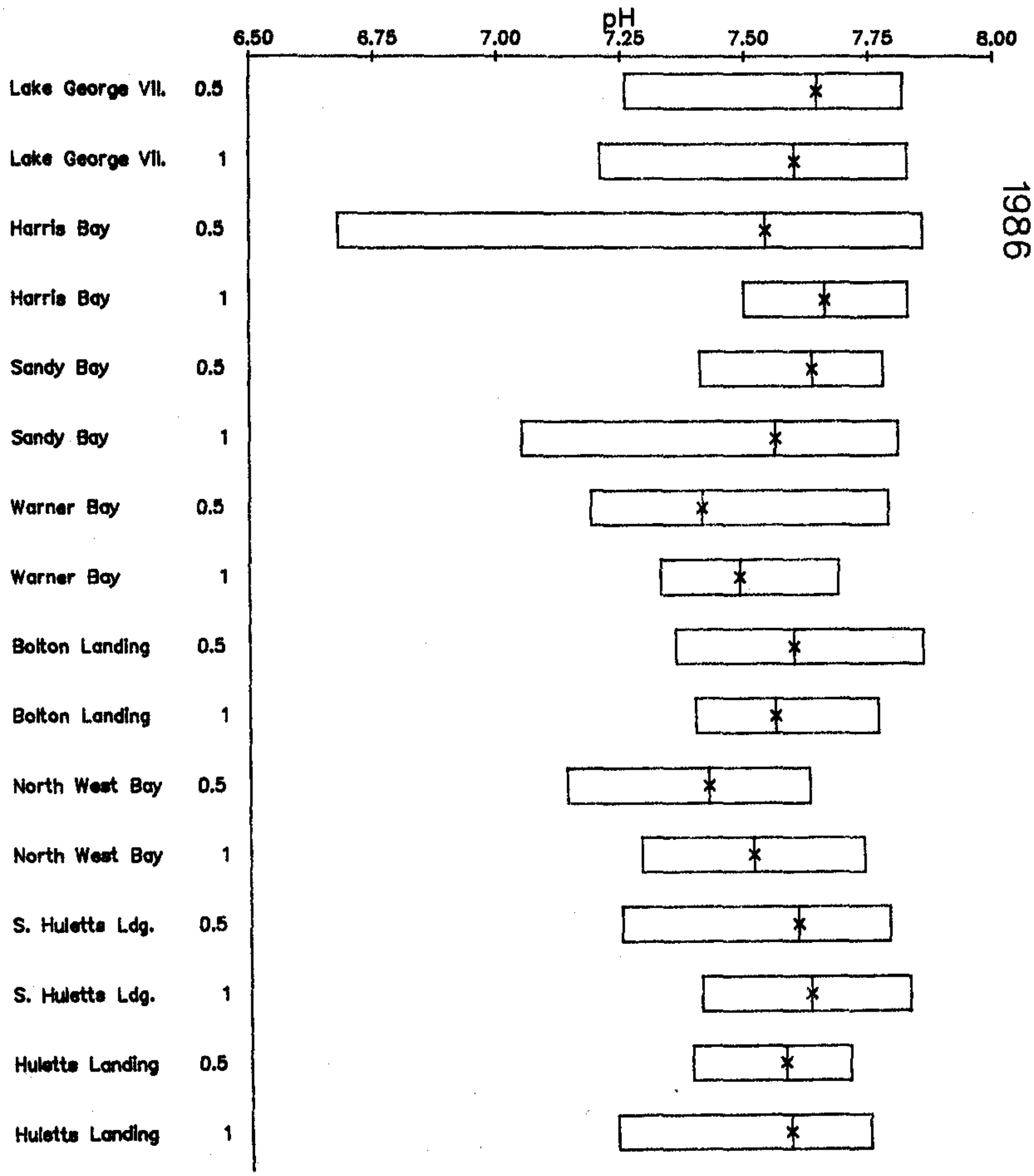

Figure 3. Minimum, maximum and average pH at inshore sampling sites.

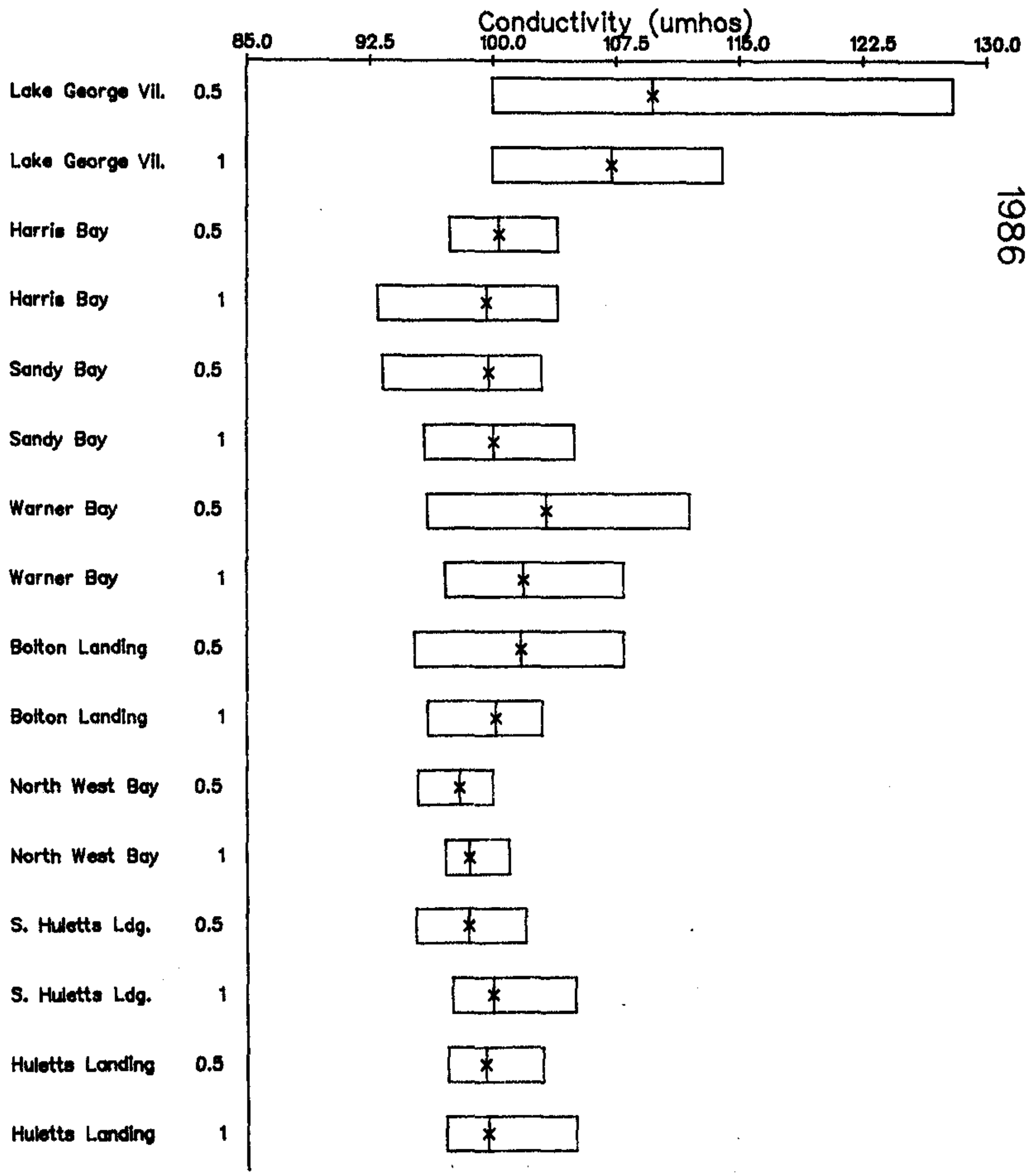

Figure 4. Minimum, maximum and average conductivity at all inshore sites.

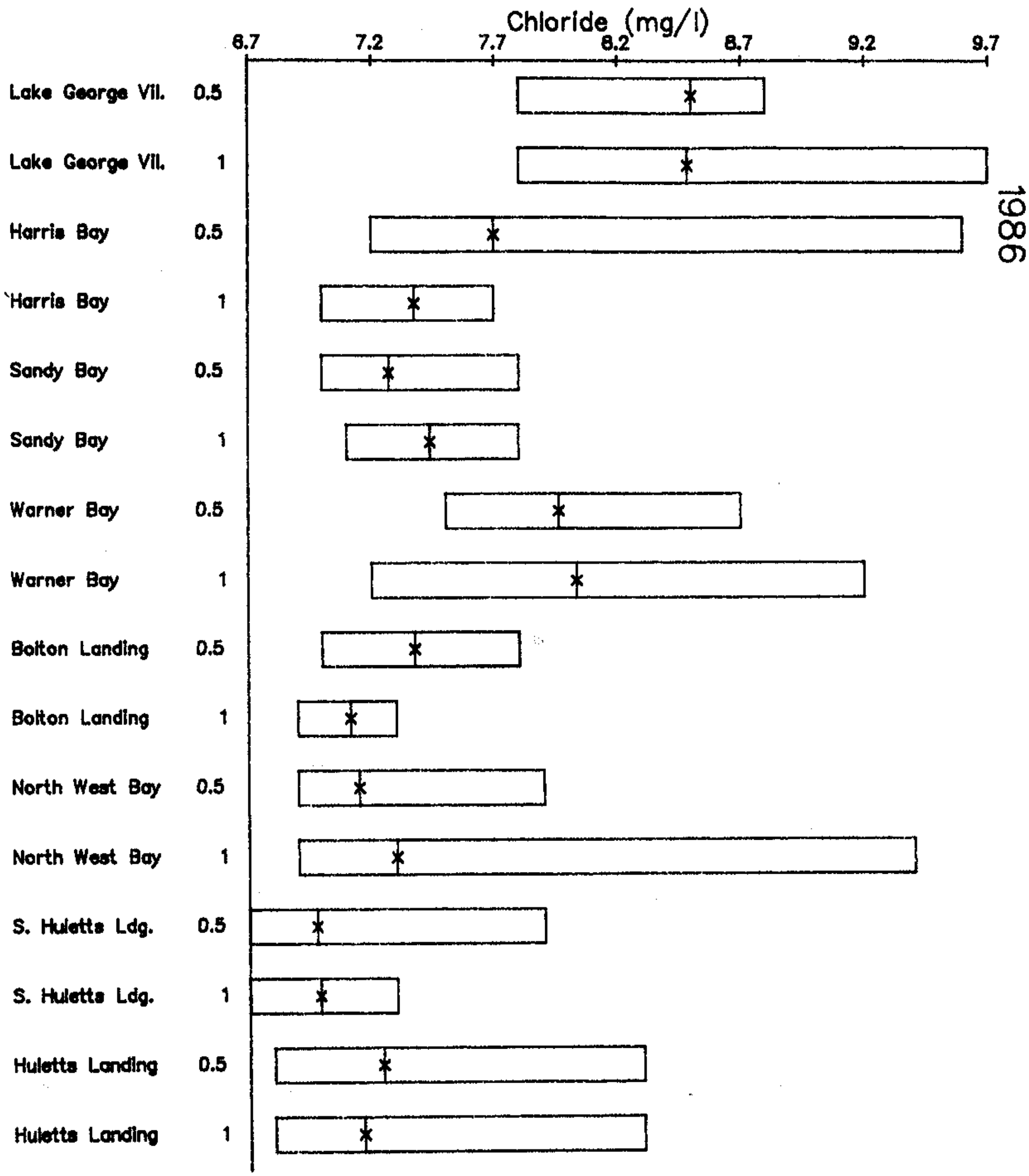

Figure 5. Minimum, maximum and average chloride concentrations at each inshore site.

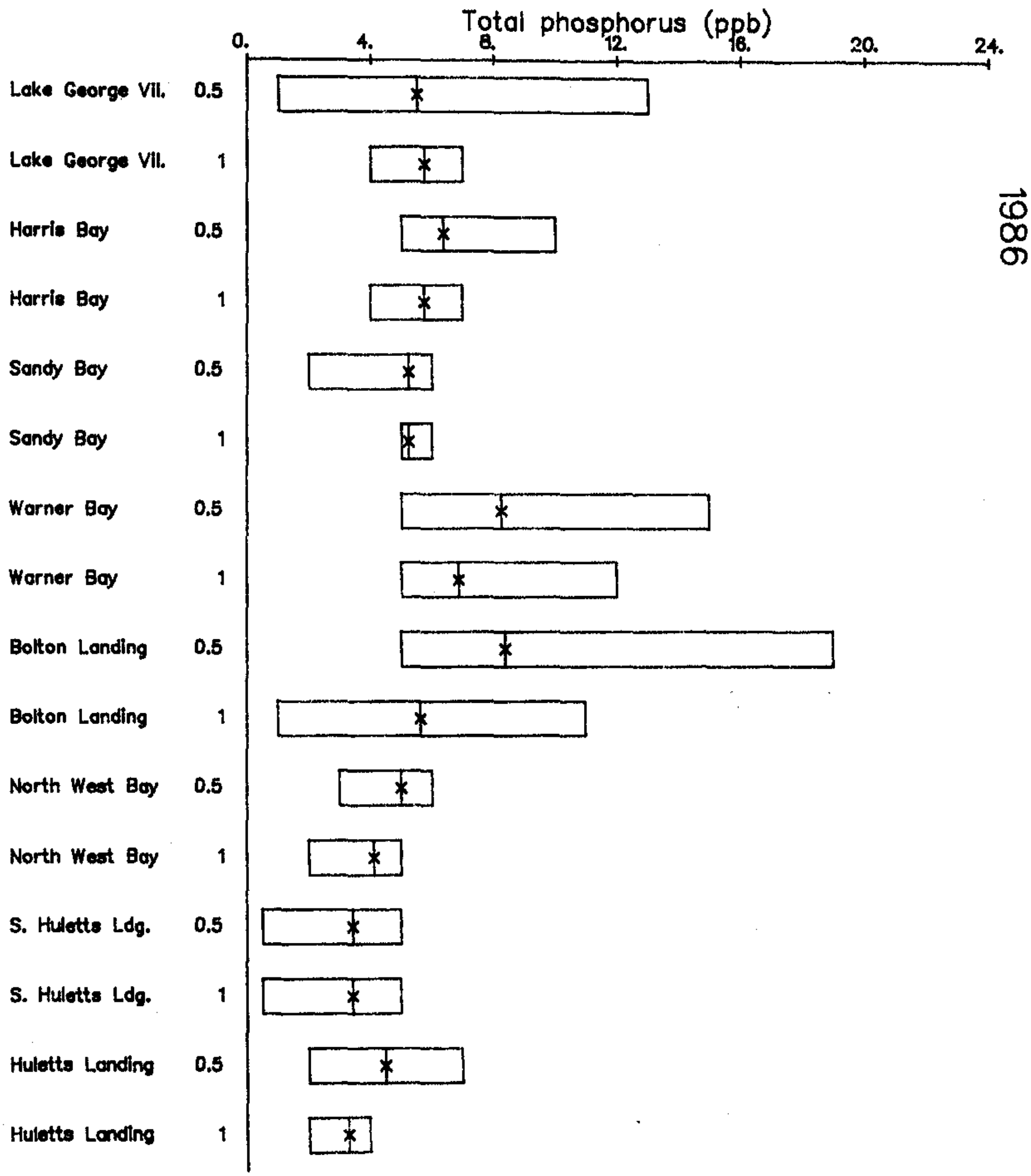

Figure 6. Minimum, maximum and average total phosphorus concentrations at each inshore site.

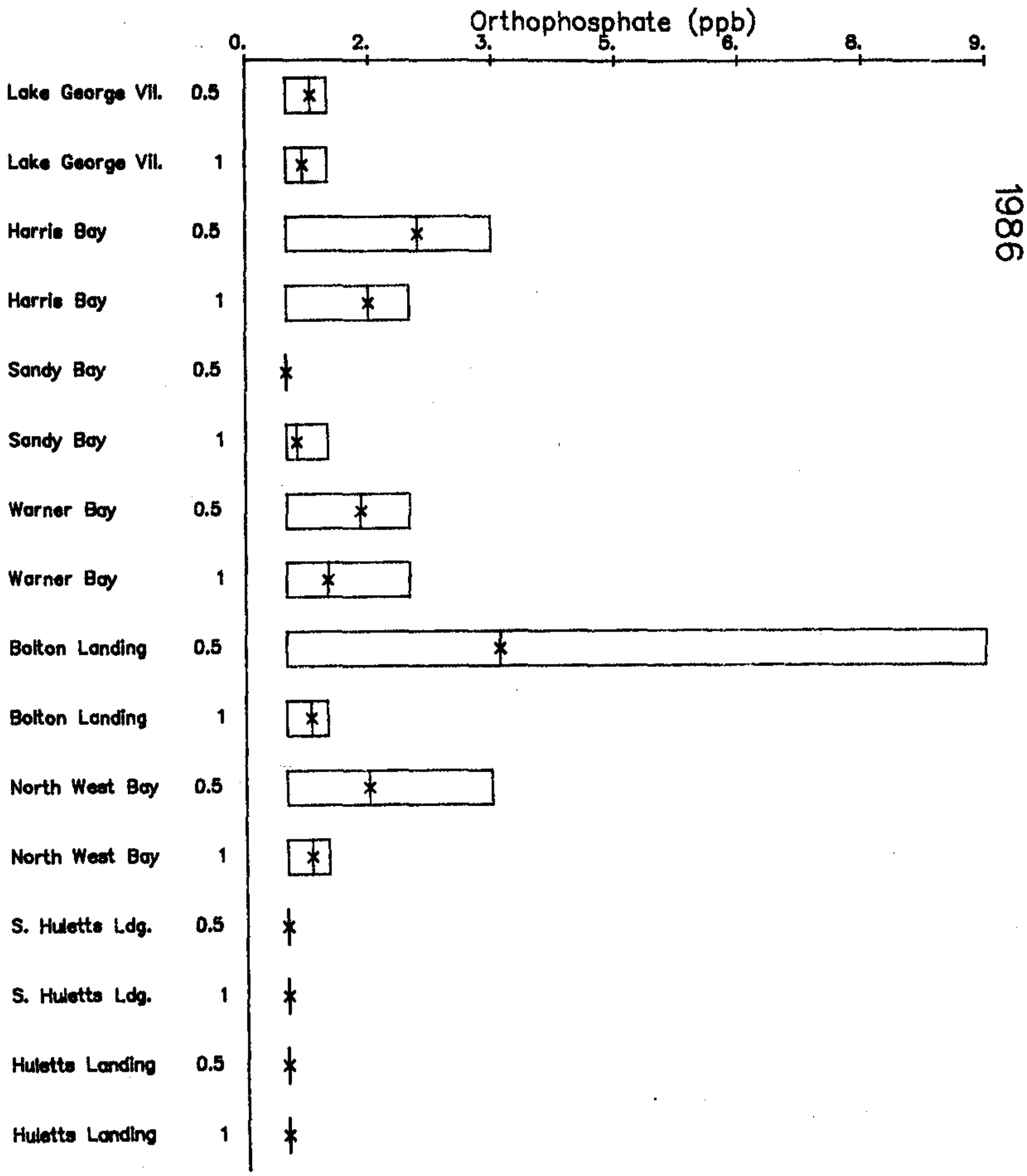

Figure 7. Minimum, maximum and average Orthophosphorus concentrations at each inshore site.

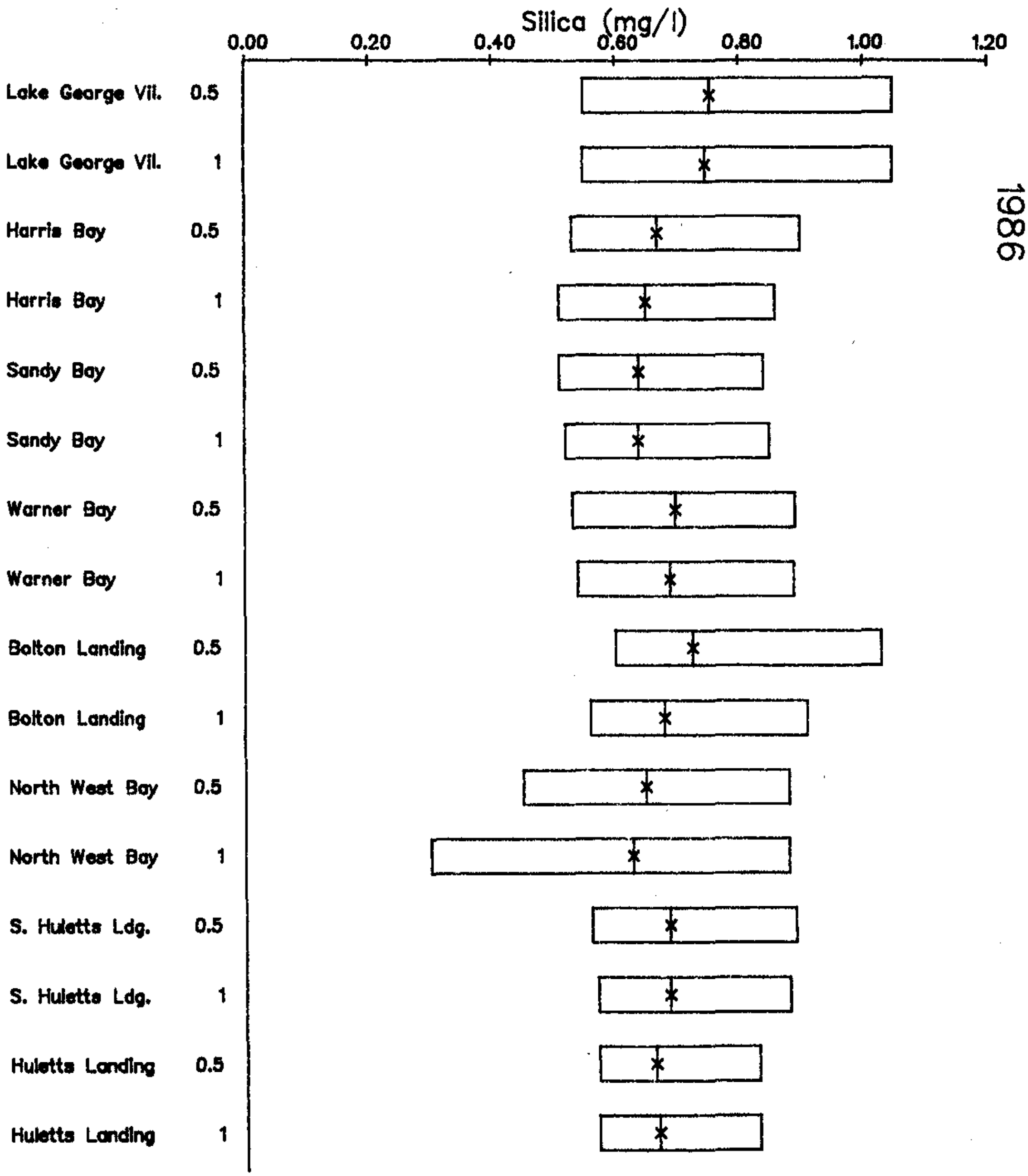

Figure 8. Minimum, maximum and average Silica concentrations at each inshore site.

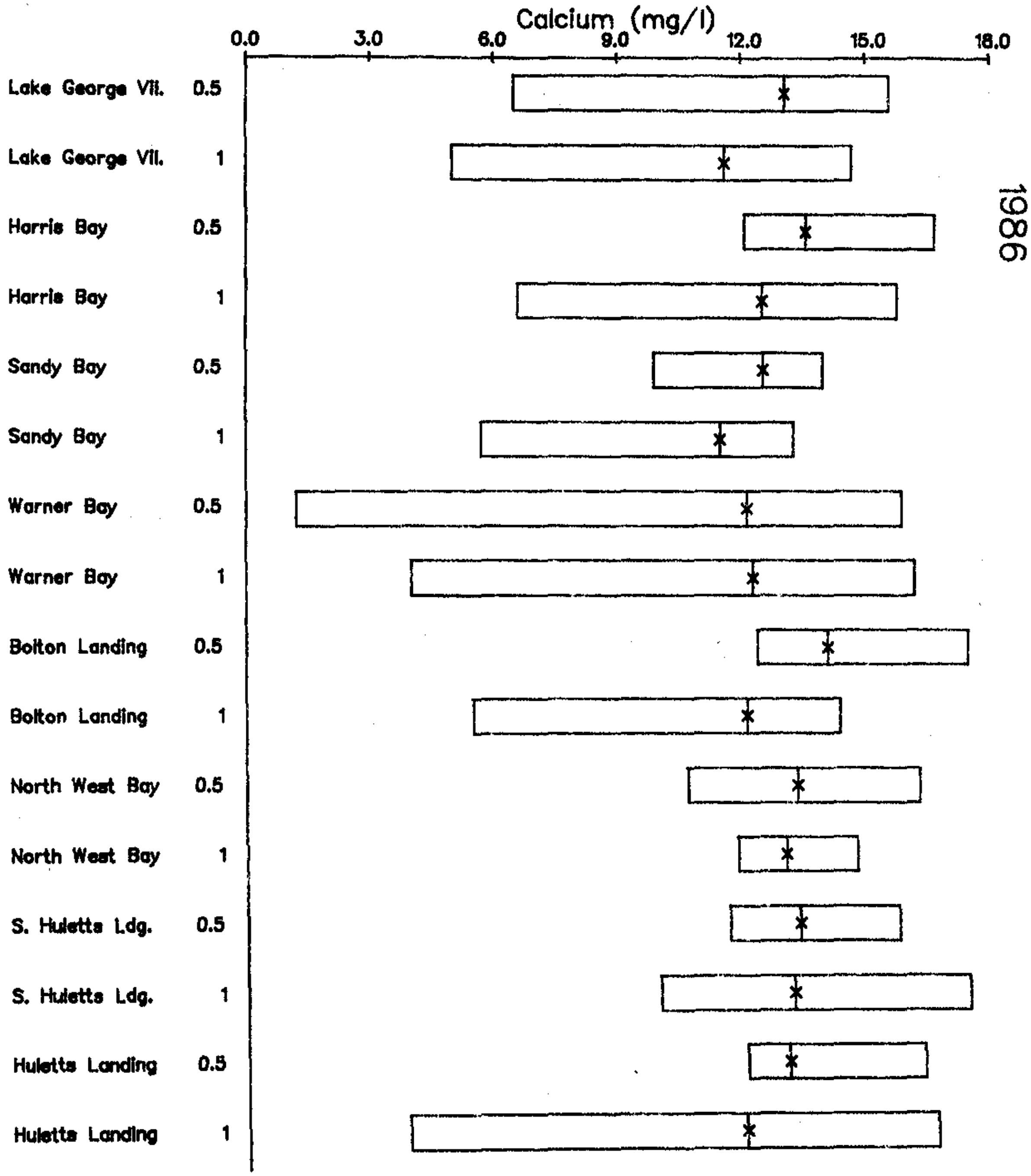

Figure 9. Minimum, maximum and average Calcium concentrations at each inshore site.

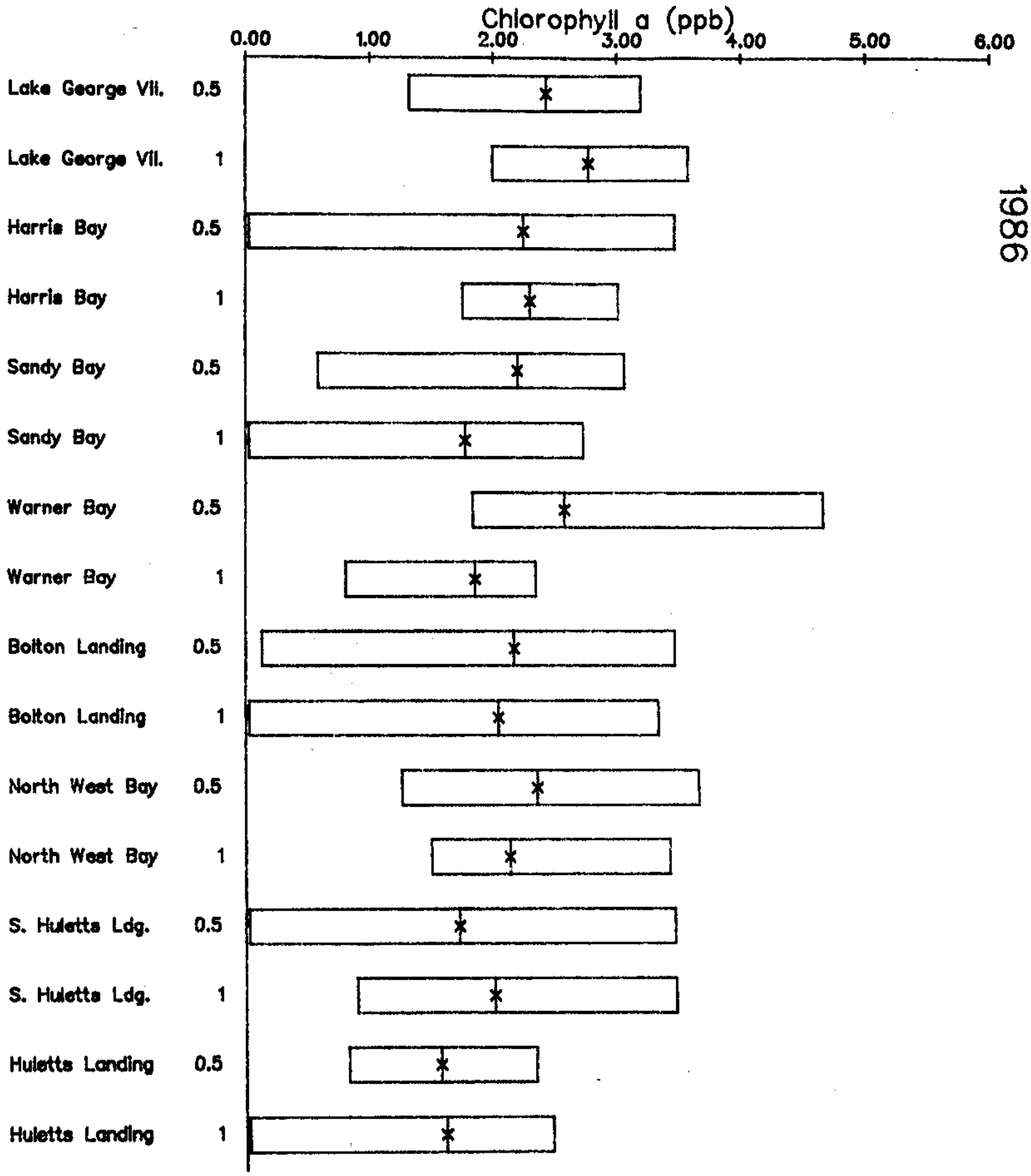

Figure 10. Minimum, maximum and average Chlorophyll a concentrations at each inshore site.

APPENDIX 3

Table 2.

1986 pH

Site	Depth	7/21 - 7/23	8/6 - 8/7	8/20	9/2 - 9/3	9/16 - 9/18	9/29 - 9/30	10/14 -10/16	10/29
Lake George Vil.	0.5	7.74	7.82	7.64	7.80	7.74	7.61	7.26	7.57
	1	7.77	7.21	7.61	7.83	7.78	7.58	7.44	7.60
Harris Bay	0.5	7.84	6.68	7.56	7.77	7.86	7.52	7.57	7.55
	1	7.78	7.76	7.62	7.72	7.83	7.50	7.56	7.53
Sandy Bay	0.5	7.78	7.41	7.64	7.72	7.77	7.60	7.50	7.57
	1	7.81	7.05	7.66	7.67	7.72	7.46	7.53	7.62
Warner Bay	0.5	7.79	7.42	7.42	7.47	7.47	7.24	7.19	7.32
	1	7.53	7.40	7.54	7.69	7.63	7.33	7.34	7.47
Bolton Landing	0.5	-----	7.74	7.86	7.67	7.59	7.36	7.51	7.47
	1	-----	7.73	7.77	7.64	7.46	7.40	7.51	7.44
North West Bay	0.5	-----	7.63	7.50	7.55	7.32	7.33	7.14	7.52
	1	-----	7.74	7.49	7.60	7.47	7.60	7.29	7.52
S. Huletts Ldg.	0.5	7.25	7.79	7.73	7.62	7.56	7.68	7.58	7.63
	1	7.41	7.83	7.72	7.65	7.59	7.70	7.61	7.63
Huletts Landing	0.5	7.39	7.57	7.66	7.71	7.54	7.63	7.50	7.63
	1	7.24	7.75	7.58	7.75	7.68	7.63	7.54	7.64

----- : indicates no data available

Table 3.

1986 Conductivity (umhos)

Site	Depth	7/21 - 7/23	8/6 - 8/7	8/20	9/2 - 9/3	9/16 - 9/18	9/29 - 9/30	10/14 -10/16	10/29
Lake George Vil.	0.5	128.0	111.0	100.0	111.0	104.0	107.0	107.0	110.0
	1	107.0	114.0	100.0	109.0	105.0	105.0	106.0	112.0
Harris Bay	0.5	98.0	104.0	97.4	100.0	100.0	100.0	100.0	104.0
	1	93.0	103.0	97.3	100.0	100.0	100.0	99.8	104.0
Sandy Bay	0.5	101.0	103.0	93.3	100.0	100.0	99.0	99.8	102.0
	1	102.0	105.0	95.8	99.7	98.9	99.0	99.1	101.0
Warner Bay	0.5	104.0	112.0	96.0	102.0	99.1	102.0	108.0	103.0
	1	100.0	108.0	97.1	102.0	100.0	103.0	102.0	103.0
Bolton Landing	0.5	-----	105.0	95.2	100.0	98.5	108.0	99.4	106.0
	1	-----	102.0	96.0	100.0	98.8	102.0	99.5	103.0
North West Bay	0.5	-----	95.4	97.9	97.5	97.8	98.3	98.7	100.0
	1	-----	99.1	98.0	97.1	99.1	98.2	97.4	101.0
S. Huletts Ldg.	0.5	101.0	102.0	98.0	96.4	95.3	97.9	97.5	100.0
	1	105.0	104.0	99.0	97.5	97.5	97.8	98.1	101.0
Huletts Landing	0.5	103.0	100.0	103.0	98.2	97.6	97.2	99.3	98.0
	1	102.0	106.0	101.0	97.6	98.2	97.1	98.4	98.0

----- : indicates no data available

Table 4.

1986		Chloride (mg/l)							
Site	Depth	7/21 - 7/23	8/6 - 8/7	8/20	9/2 - 9/3	9/16 - 9/18	9/29 - 9/30	10/14 -10/16	10/29
Lake George Vil.	0.5	-----	8.8	-----	8.8	7.8	-----	8.6	-----
	1	8.7	9.7	8.2	8.8	7.8	-----	8.2	8.0
Harris Bay	0.5	7.7	7.6	7.6	7.4	7.2	7.2	7.3	9.6
	1	7.7	7.6	7.4	7.3	7.0	7.5	7.2	7.3
Sandy Bay	0.5	7.8	7.4	7.3	7.2	7.0	-----	7.1	7.1
	1	7.8	7.4	7.8	7.2	7.1	7.7	7.2	7.3
Warner Bay	0.5	7.8	7.8	8.0	-----	7.6	-----	-----	8.7
	1	7.8	8.0	7.7	8.3	7.2	-----	-----	9.2
Bolton Landing	0.5	7.8	7.6	7.3	7.3	7.2	7.3	7.0	7.5
	1	-----	7.3	7.0	7.1	7.2	7.3	6.9	7.0
North West Bay	0.5	7.9	6.9	6.9	7.0	7.2	7.0	-----	-----
	1	9.4	6.9	6.9	7.0	7.0	6.9	7.1	7.2
S. Huletts Ldg.	0.5	7.1	6.9	6.7	6.9	6.9	6.7	6.7	7.9
	1	6.8	6.9	6.7	6.9	7.2	6.8	7.3	7.3
Huletts Landing	0.5	8.3	6.8	8.0	7.0	6.9	6.8	-----	6.9
	1	7.3	6.8	6.9	6.9	6.9	8.3	7.1	7.1

----- : indicates no data available

Table 5.

1986		Nitrate (mg/l)							
Site	Depth	7/21 - 7/23	8/6 - 8/7	8/20	9/2 - 9/3	9/16 - 9/18	9/29 - 9/30	10/14 -10/16	10/29
Lake George Vil.	0.5	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	1	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Harris Bay	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	1	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Sandy Bay	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	-----	<0.01	<0.01
	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Warner Bay	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Bolton Landing	0.5	-----	<0.01	<0.01	<0.01	<0.01	-----	<0.01	0.01
	1	-----	<0.01	0.01	0.02	0.01	-----	<0.01	<0.01
North West Bay	0.5	-----	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02
	1	-----	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
S. Huletts Ldg.	0.5	<0.01	<0.01	0.01	<0.01	0.01	-----	<0.01	<0.01
	1	<0.01	<0.01	<0.01	<0.01	<0.01	-----	<0.01	<0.01
Huletts Landing	0.5	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

----- : indicates no data available

Table 6.

1986 — Ammonia (mg/l)

Site	Depth	7/21 - 7/23	8/6 - 8/7	8/20	9/2 - 9/3	9/16 - 9/18	9/29 - 9/30	10/14 -10/15	10/29
Lake George Vil.	0.5	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Harris Bay	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	1	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Sandy Bay	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	-----	<0.01	<0.01
	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Warner Bay	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
	1	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Bolton Landing	0.5	-----	<0.01	<0.01	<0.01	<0.01	-----	<0.01	0.01
	1	-----	<0.01	<0.01	<0.01	<0.01	-----	<0.01	<0.01
North West Bay	0.5	-----	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02
	1	-----	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
S. Huletts Ldg.	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	-----	<0.01	<0.01
	1	<0.01	<0.01	<0.01	<0.01	<0.01	-----	<0.01	<0.01
Huletts Landing	0.5	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01
	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

----- : indicates no data available

Table 7.

1986 — Total phosphorus (ppb)

Site	Depth	7/21 - 7/23	8/6 - 8/7	8/20	9/2 - 9/3	9/16 - 9/18	9/29 - 9/30	10/14 -10/15	10/29
Lake George Vil.	0.5	5.	3.	1.	13.	6.	5.	6.	5.
	1	4.	5.	6.	7.	7.	6.	6.	5.
Harris Bay	0.5	5.	10.	8.	5.	5.	6.	5.	7.
	1	4.	7.	6.	7.	5.	6.	5.	6.
Sandy Bay	0.5	5.	6.	2.	6.	5.	6.	6.	6.
	1	5.	6.	5.	6.	5.	5.	5.	5.
Warner Bay	0.5	8.	11.	5.	15.	7.	7.	6.	7.
	1	7.	8.	5.	12.	6.	6.	5.	6.
Bolton Landing	0.5	7.	5.	8.	7.	8.	8.	5.	19.
	1	4.	5.	1.	11.	6.	6.	4.	8.
North West Bay	0.5	5.	5.	3.	6.	5.	4.	6.	6.
	1	5.	3.	2.	5.	3.	5.	5.	5.
S. Huletts Ldg.	0.5	3.	3.	<1.	4.	4.	4.	5.	4.
	1	3.	4.	<1.	4.	2.	4.	5.	5.
Huletts Landing	0.5	3.	4.	2.	4.	6.	7.	4.	6.
	1	2.	4.	2.	-----	3.	4.	4.	4.

----- : indicates no data available

Table 8.

1986		Total filterable phosphorus (ppb)							
Site	Depth	7/21 - 7/23	8/6 - 8/7	8/20	9/2 - 9/3	9/16 - 9/18	9/29 - 9/30	10/14 -10/16	10/29
Lake George Vil.	0.5	-----	<1.	2.	8.	<1.	19.	4.	3.
	1	5.	1.	2.	8.	<1.	-----	5.	3.
Harris Bay	0.5	4.	5.	2.	2.	<1.	4.	4.	3.
	1	2.	8.	2.	2.	<1.	3.	4.	4.
Sandy Bay	0.5	4.	5.	2.	2.	<1.	7.	2.	3.
	1	2.	3.	2.	<1.	<1.	-----	5.	3.
Warner Bay	0.5	5.	-----	3.	10.	1.	-----	6.	3.
	1	7.	-----	4.	5.	<1.	-----	-----	3.
Bolton Landing	0.5	4.	3.	2.	2.	<1.	<1.	5.	9.
	1	-----	2.	1.	<1.	1.	<1.	3.	3.
North West Bay	0.5	2.	-----	1.	1.	<1.	<1.	4.	-----
	1	6.	1.	1.	2.	<1.	<1.	6.	2.
S. Huletts Ldg.	0.5	2.	2.	<1.	3.	<1.	<1.	5.	9.
	1	2.	<1.	<1.	3.	2.	<1.	5.	8.
Huletts Landing	0.5	2.	4.	1.	5.	<1.	2.	4.	2.
	1	2.	4.	2.	-----	<1.	4.	-----	3.

----- : indicates no data available

Table 9.

1986		Orthophosphate (ppb)							
Site	Depth	7/21 - 7/23	8/6 - 8/7	8/20	9/2 - 9/3	9/16 - 9/18	9/29 - 9/30	10/14 -10/16	10/29
Lake George Vil.	0.5	1.	-----	-----	-----	<1.	<1.	1.	1.
	1	1.	-----	-----	-----	<1.	<1.	1.	<1.
Harris Bay	0.5	3.	-----	-----	-----	<1.	3.	2.	2.
	1	1.	-----	-----	-----	<1.	2.	2.	2.
Sandy Bay	0.5	-----	-----	-----	-----	<1.	<1.	<1.	<1.
	1	-----	-----	-----	-----	<1.	<1.	1.	<1.
Warner Bay	0.5	2.	-----	-----	-----	<1.	<1.	2.	2.
	1	1.	-----	-----	-----	<1.	<1.	1.	2.
Bolton Landing	0.5	-----	<1.	-----	-----	2.	3.	1.	9.
	1	-----	<1.	-----	-----	1.	<1.	1.	1.
North West Bay	0.5	2.	-----	-----	-----	3.	1.	<1.	1.
	1	1.	-----	-----	-----	<1.	1.	<1.	1.
S. Huletts Ldg.	0.5	-----	-----	-----	-----	<1.	<1.	<1.	<1.
	1	-----	-----	-----	-----	<1.	<1.	<1.	<1.
Huletts Landing	0.5	-----	-----	-----	-----	<1.	<1.	<1.	<1.
	1	-----	-----	-----	-----	<1.	<1.	<1.	<1.

----- : indicates no data available

Table 10.

1986

Silica (mg/l)

Site	Depth	7/21 - 7/23	8/6 - 8/7	8/20	9/2 - 9/3	9/16 - 9/18	9/29 - 9/30	10/14 -10/15	10/29
Lake George Vil.	0.5	0.62	0.66	0.55	0.66	0.70	0.80	1.00	1.06
	1	0.60	0.75	0.55	0.65	0.70	0.78	0.90	1.05
Harris Bay	0.5	0.53	0.56	0.58	0.60	0.65	0.74	0.79	0.90
	1	0.51	0.54	0.57	0.60	0.65	0.72	0.76	0.86
Sandy Bay	0.5	0.55	0.51	0.51	0.56	0.64	0.72	0.78	0.84
	1	0.54	0.53	0.52	0.55	0.64	0.70	0.77	0.85
Warner Bay	0.5	0.53	0.87	0.71	0.59	0.65	0.70	0.74	0.89
	1	0.54	0.89	0.70	0.69	0.65	0.69	0.70	0.86
Bolton Landing	0.5	0.67	0.60	0.61	0.63	0.62	0.82	0.82	1.03
	1	0.57	0.56	0.57	0.60	0.64	0.77	0.82	0.91
North West Bay	0.5	0.45	0.59	0.57	0.58	0.62	0.70	0.80	0.88
	1	0.30	0.53	0.55	0.60	0.62	0.72	0.82	0.88
S. Huletts Ldg.	0.5	0.57	0.70	0.60	0.56	0.64	0.71	0.82	0.89
	1	0.58	0.69	0.57	0.58	0.67	0.70	0.82	0.88
Huletts Landing	0.5	0.58	0.62	0.57	0.58	0.65	0.70	0.77	0.83
	1	0.59	0.62	0.57	0.59	0.65	0.71	0.78	0.83

----- : indicates no data available

Table 11.

1986

Calcium (mg/l)

Site	Depth	7/21 - 7/23	8/6 - 8/7	8/20	9/2 - 9/3	9/16 - 9/18	9/29 - 9/30	10/14 -10/15	10/29
Lake George Vil.	0.5	12.5	15.6	15.0	6.5	12.9	13.6	14.2	14.2
	1	12.9	14.7	5.0	6.4	13.0	13.5	13.8	13.7
Harris Bay	0.5	12.1	16.7	15.0	13.0	12.7	13.0	13.0	13.2
	1	12.0	13.7	15.8	6.6	12.9	13.1	13.0	13.2
Sandy Bay	0.5	12.3	9.9	14.0	13.2	12.5	12.8	13.1	12.6
	1	12.0	12.2	11.0	5.7	12.5	12.8	13.3	12.6
Warner Bay	0.5	12.3	14.8	15.9	1.2	12.6	13.3	13.6	13.6
	1	12.0	15.4	16.2	4.0	11.0	13.3	13.2	13.3
Bolton Landing	0.5	12.8	14.2	15.2	17.5	12.4	13.5	12.9	14.4
	1	11.3	13.5	14.4	5.5	13.1	13.5	12.8	13.1
North West Bay	0.5	10.7	16.3	14.8	14.6	12.4	12.5	12.8	12.7
	1	11.9	12.9	14.8	14.7	12.4	12.6	12.8	12.5
S. Huletts Ldg.	0.5	11.7	15.3	15.8	13.9	12.4	12.6	12.8	12.7
	1	11.9	14.9	13.9	17.5	12.4	12.6	12.8	10.0
Huletts Landing	0.5	12.1	13.7	16.4	12.6	12.5	12.5	12.8	12.1
	1	12.1	13.4	16.7	3.9	12.5	12.5	13.0	12.5

----- : indicates no data available

Table 12.

1986 Site	Depth	7/21 - 7/23	8/6 - 8/7	8/20	9/2 - 9/3	9/16 - 9/18	9/29 - 9/30	10/14 - 10/15	10/29
		Chlorophyll a (ppb)							
Lake George Vil.	0.5	2.21	-----	2.22	1.32	3.20	2.56	2.89	2.67
	1	-----	-----	2.07	2.00	2.86	3.58	3.34	2.81
Harris Bay	0.5	<0.05	-----	3.47	2.79	2.17	2.63	2.93	1.75
	1	1.85	-----	2.42	2.16	2.26	3.02	2.66	1.76
Sandy Bay	0.5	0.59	-----	2.76	2.21	2.26	2.17	3.07	2.37
	1	<0.05	-----	1.30	1.63	1.86	2.74	2.44	2.46
Warner Bay	0.5	4.67	-----	2.13	1.84	2.09	2.84	2.26	2.23
	1	2.08	-----	2.25	1.42	2.36	2.21	0.81	1.90
Bolton Landing	0.5	2.21	1.74	2.05	0.13	2.35	3.47	3.07	2.36
	1	1.19	<0.05	1.47	1.85	2.39	3.16	3.34	2.92
North West Bay	0.5	1.50	1.26	2.20	1.73	2.42	3.07	3.66	3.03
	1	1.58	2.61	1.72	1.60	1.99	2.08	3.43	2.19
S. Huletts Ldg.	0.5	<0.05	1.53	1.17	1.37	2.08	1.71	3.47	2.46
	1	2.13	1.53	0.90	1.22	2.07	1.99	3.48	2.81
Huletts Landing	0.5	0.83	1.47	1.58	1.32	1.94	1.58	2.36	1.56
	1	<0.05	1.84	1.58	1.54	2.48	1.86	1.85	1.78

----- : indicates no data available