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WATER QUALITY CHARACTERISTICS OF SEVERAL SOUTHEAST FLORIDA CANALS

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by

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ABSTRACT

Water quality data collected over the period June 1974 - July 1975 on several of the major lower east coast canals (western C-51, Hillsboro, North New River, Tamiami and Snapper Creek) was summarized with respect to seasonal and intercanal trends and differences. These data were used to compute nutrient loads from each of the basins under the current land use conditions.

Results indicate dissolved oxygen concentrations generally below 4.0 mg/l except in the low flow period from January through May. Nutrients and major constituents were quite variable with a trend toward higher nutrient concentrations and lower concentrations of major constituents in the wet season.

Areal export rates of nitrogen ranged from 0.59 g/m^2-yr to 1.99 g/m^2-yr on the Tamiami and North New River Canals respectively. Application of nitrogen export rates reported in the literature for the various land use categories in each of the basins resulted in lower values than the rates obtained from the data.

Phosphorus exports from the basins ranged from 0.012 g/m^2-yr to 0.085 g/m^2-yr for the North New River and Hillsboro basin respectively. The areal export rates of phosphorus on both the Tamiami and North New River basins were considerably below levels expected from the existing land use conditions. The reduction in phosphorus exports from the basins was attributed to the reaction of phosphorus with the limestone (calcium carbonate) geological formation in these basins.

INTRODUCTION

The concept of backpumping surplus water from the lower east coast of Florida to the interior Conservation Areas has been proposed by the Corps of Engineers (1968) and recently evaluated by the South Florida Water Management District (1977), as part of the draft Water Use and Supply Development Plan.

This technical report presents the results of an investigation carried out during 1974 and 1975 to determine the water quality characteristics of several of these major lower east coast canals and the nutrient loadings being discharged under current land use conditions in their respective drainage basins. This report documents a portion of the data and analysis used in the evaluation of the potential water quality impacts of backpumping as presented in the Water Use and Supply Development Plan.

The five canal reaches (western C-51, Hillsboro, North New River, Tamiami and Snapper Creek) sampled for this study are all located on the lower east Florida coast (Fig. 1) between the cities of West Palm Beach and Miami. The easternmost reaches of these canals represent a major part of the flood control, salinity control and water supply network of the populous coastline region. The Hillsboro, North New River and Tamiami Canals receive water from the Conservation Areas (Fig. 1) during the dry season by demand releases through man-made structures, or in the case of the Tamiami Canal, via groundwater seepage. The C-51 canal is supplied in the dry season by discharges of water at the S-5AE structure from the western section of the West Palm Beach Canal and the L-8 canal. Discharges to the east from the S-5AE structure are also made in the wet season for flood control purposes.

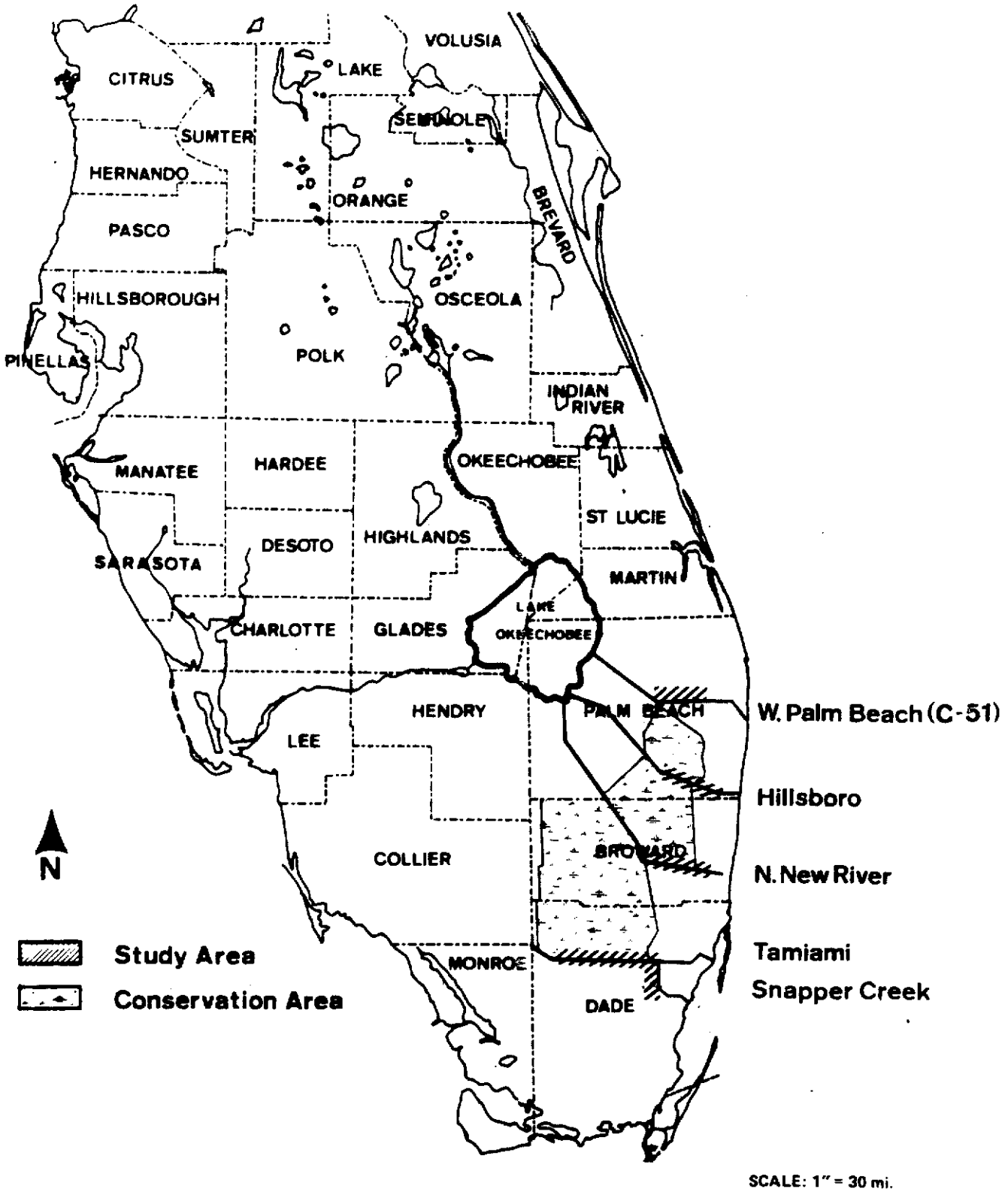

Figure 1. Location of Study Areas.

The land uses within the four drainage basins exhibit considerable variation in the mix of urban, agricultural and undeveloped land as shown in Table 1. Urban land use is the largest category in the North New River and Tamiami basins (western portions) while agriculture is the predominant land use in the Hillsboro Basin. The forested and wetland category is the largest land use type in the western C-51 basin.

TABLE 1. MAJOR LAND USES ON THE LOWER EAST COAST CANALS

Basin	Urban		Agricultural		Forested & Wetland		
	Acres	% of Total	Acres	% of Total	Acres	% of Total	Total Acres
Western C-51	18,316	24	20,509	27	30,741	41	74,850
Hillsboro	14,110	22	27,108	42	15,178	24	64,510
North New River	8,904	49	4,799	26	2,249	12	18,259
Tamiami	16,908	37	4,930	11	11,149	25	45,336

MATERIALS AND METHODS

Sampling Locations and Frequencies

Three or four stations were sampled on each of the four study canals, a total of fourteen stations in all. Identifications for stations were made up using a three letter abbreviation for the name of the canal and a 3 digit number indicating the distance in miles from the ~~easternmost~~ point of the canal. The only exception is for the Snapper Creek station, TSC-S3.5 which is 3.5 miles south of the Tamiami Canal.

Four stations (Fig. 2) from the S-5AE structure on the west to State Road 7 on the east, were sampled on the C-51 canal. All of these stations were located on the reach of C-51 which has been proposed for backpumping to Conservation Area I (U. S. Army Corps of Engineers, 1968). The Hillsboro Canal stations (Fig. 3) were located on the 4 mile reach of the canal east from State Road 7 to the Deerfield locks. The North New River was sampled at 3 stations (Fig. 4) spaced on the reach from the southwest corner of Conservation Area 2B to Sewell lock. The Tamiami Canal was sampled at four stations (Fig. 5). Three stations were located on the Tamiami Canal from U. S. 27 on the west to S.W. 82nd Avenue on the east. The fourth station was located on Snapper Creek south of the Tamiami Canal at S.W. 56th Street.

Samples were collected approximately biweekly from June 1974 to July 1975.

Sampling and Analytical Methods

Water samples were collected for laboratory analysis at a depth of approximately 0.5 meters using a 5 liter PVC Niskin Sampler. Subsamples were taken from the sample and prepared for analysis of dissolved nutrients and major constituents by filtering through a 0.45 micron membrane filter. Samples for major cation analysis were preserved with 10 drops/100 ml of concentrated nitric acid. Unfiltered samples were taken from the Niskin Sampler for total

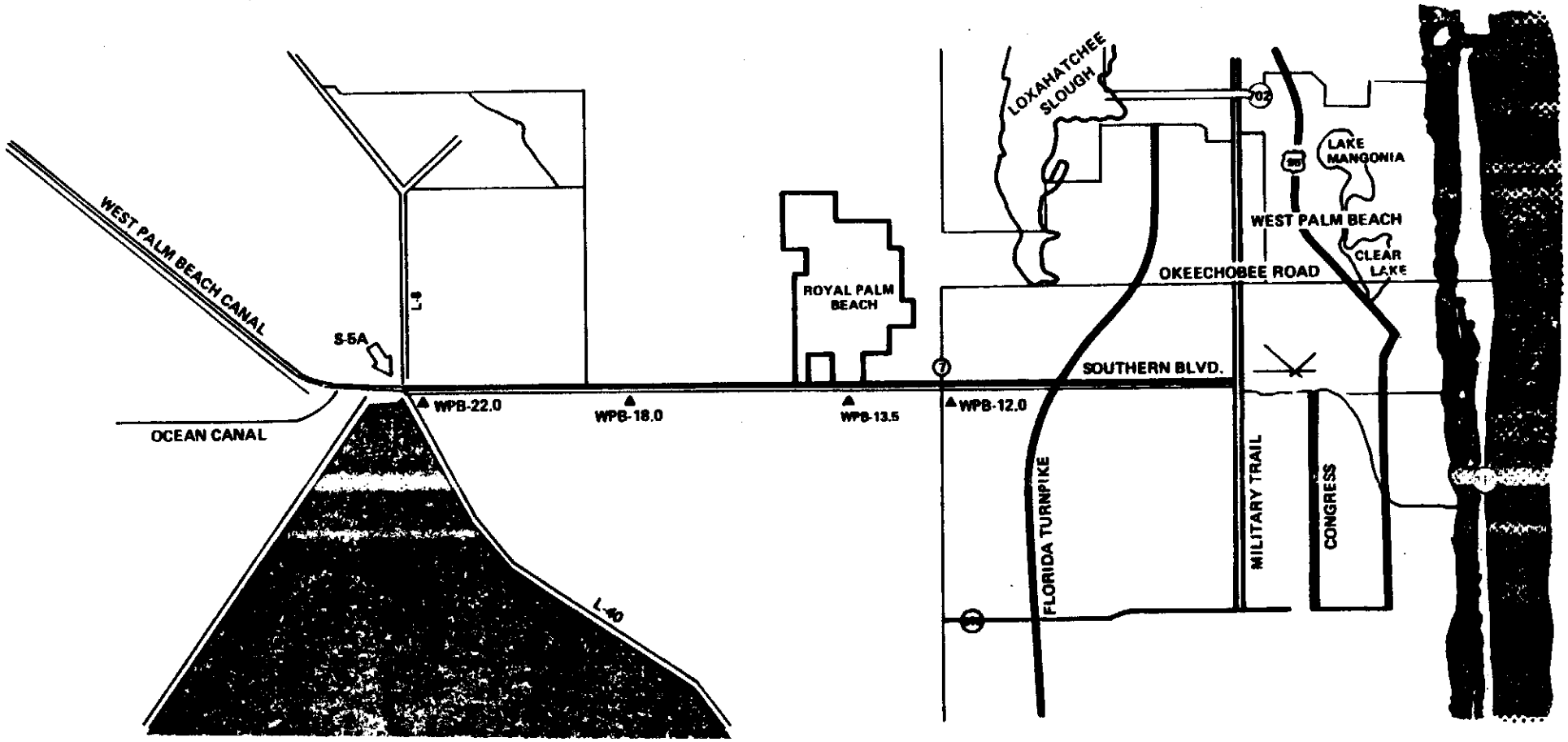

Figure 2. SAMPLING LOCATIONS ▲ ON THE C-51 CANAL.

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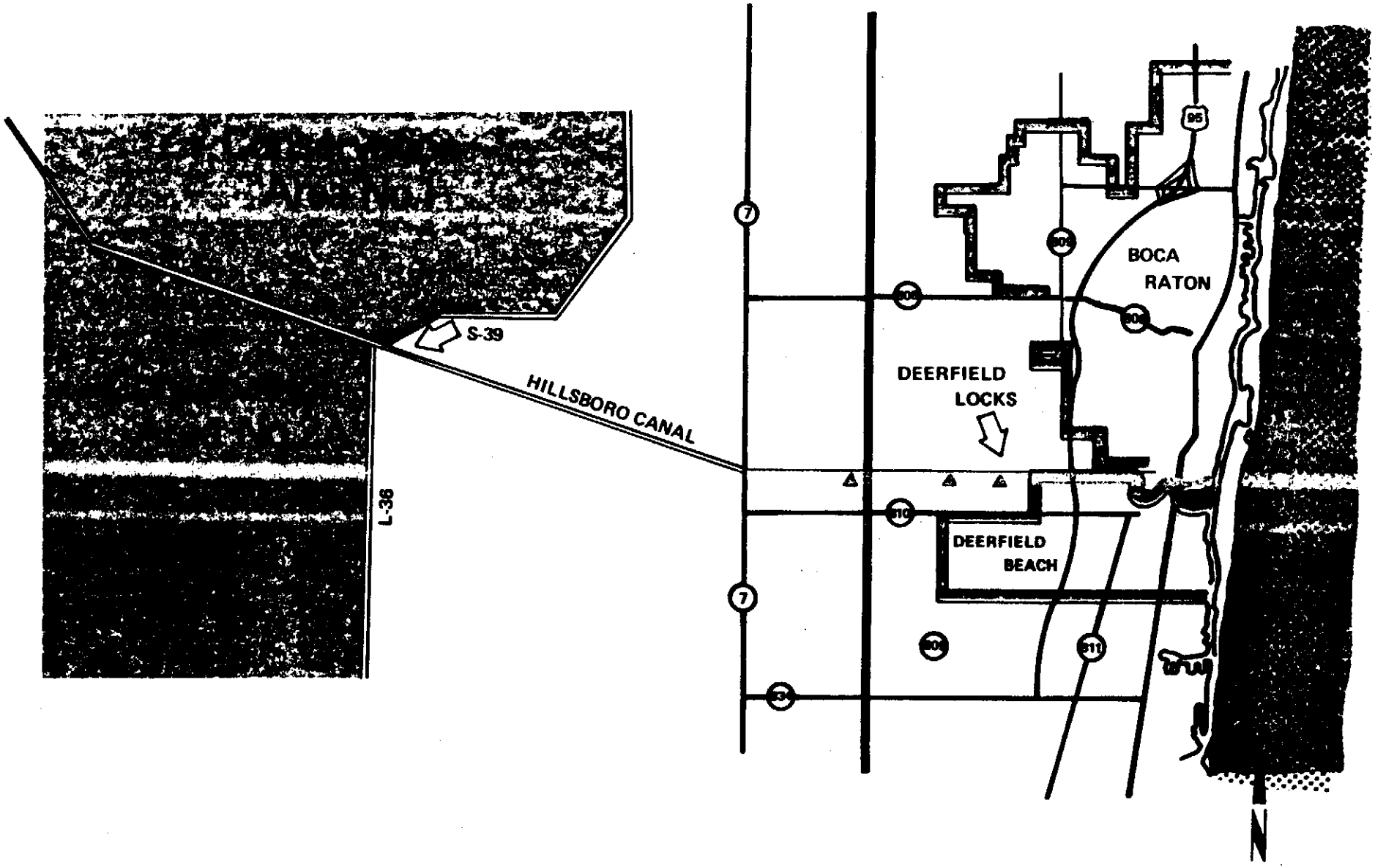

Figure 3. SAMPLING LOCATIONS ▲ ON THE HILLSBORO CANAL.

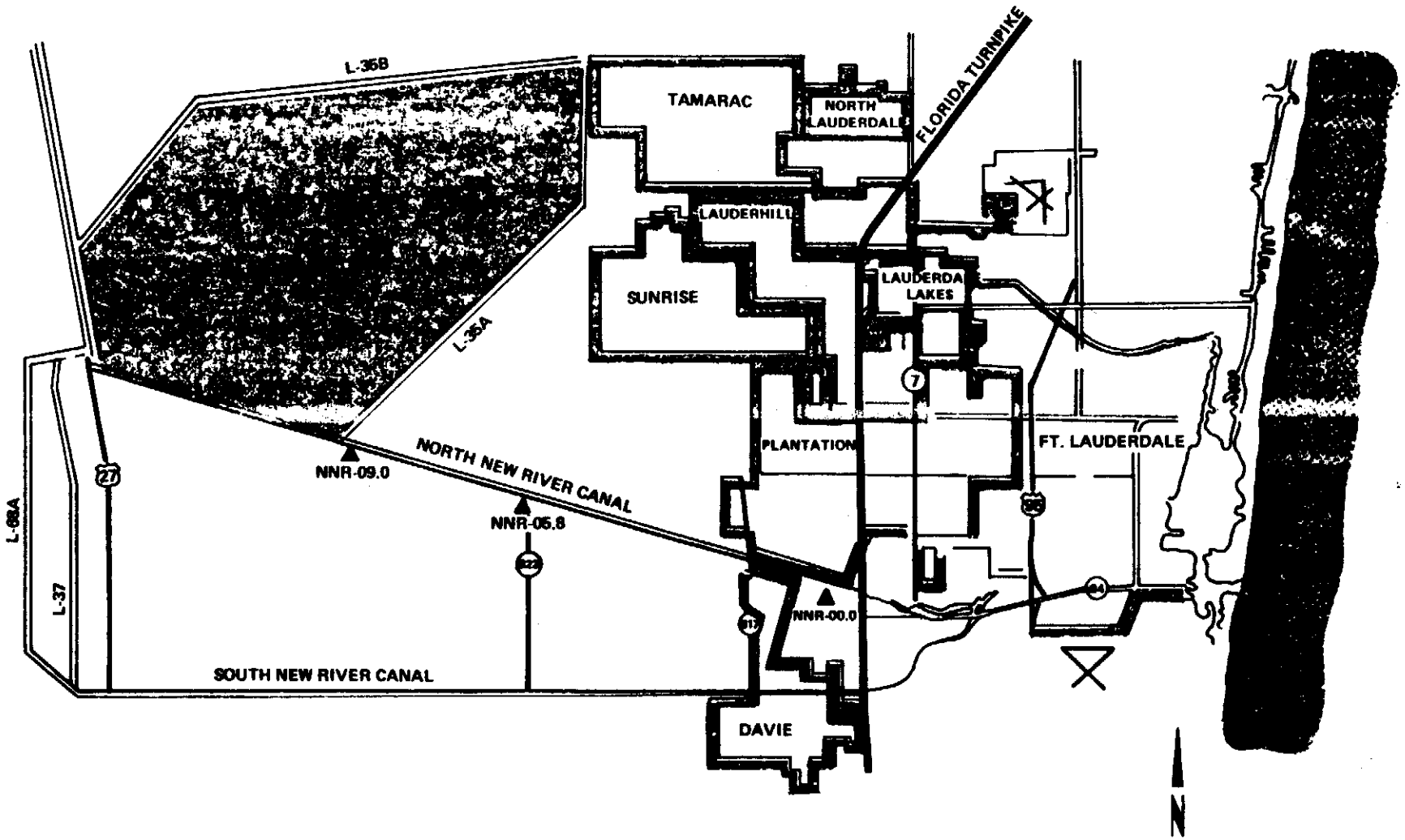

Figure 4. SAMPLING LOCATIONS ▲ ON THE NORTH NEW RIVER CANAL.

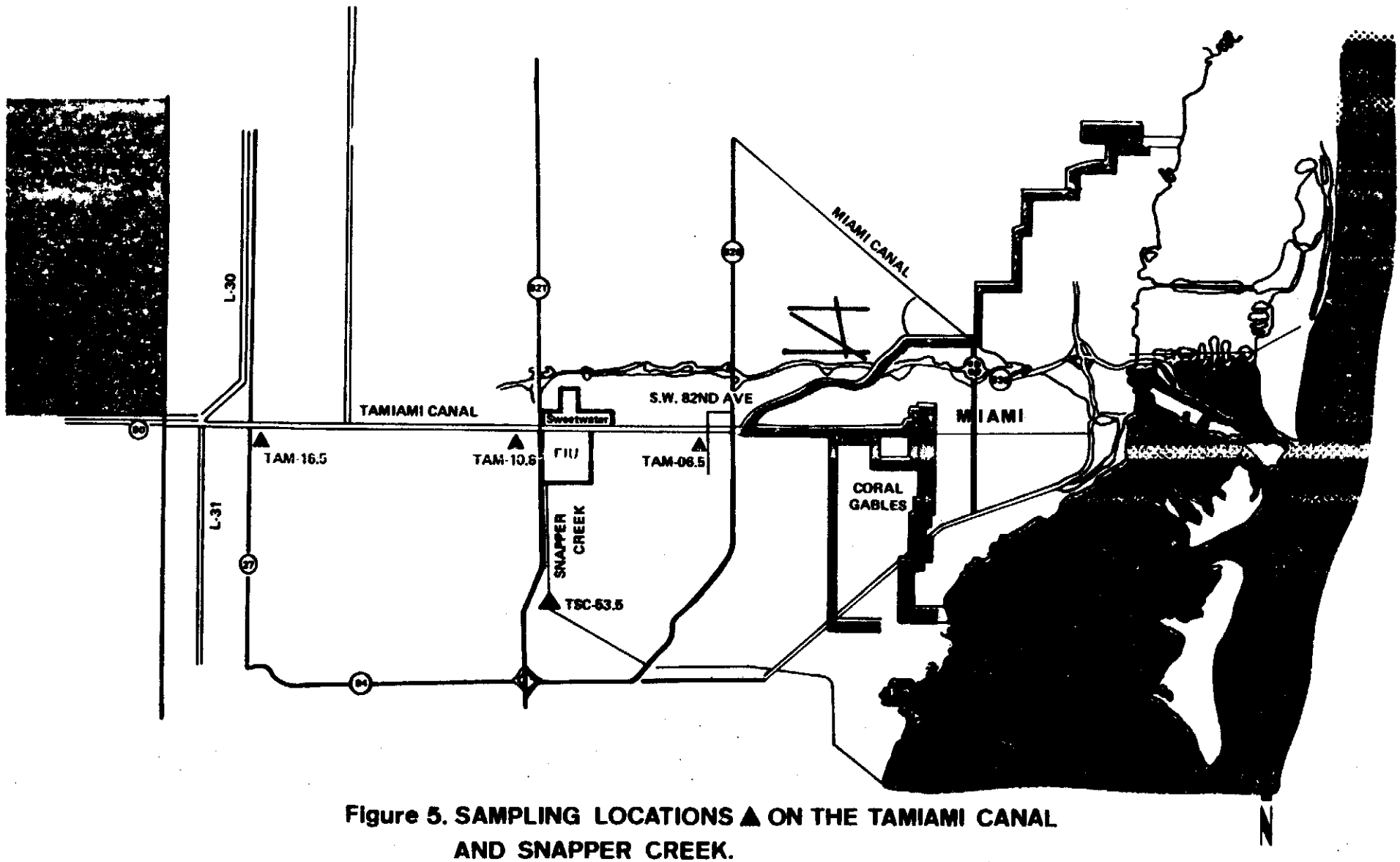

Figure 5. SAMPLING LOCATIONS ▲ ON THE TAMIAMI CANAL AND SNAPPER CREEK.

nutrient analysis. All water samples were kept on ice until return to the laboratory and transfer to a dark refrigerator where they were held for subsequent analysis, usually 1 to 2 weeks.

Field data (temperature, dissolved oxygen, pH and conductivity) were collected at each station using a Hydrolab(R) Surveyor II. All four of these field parameters were measured at 1 meter intervals from the surface to the bottom.

The routine laboratory analyses performed on each water sample were: dissolved nutrients (ortho-phosphorus, nitrate plus nitrite, nitrite and ammonia), total phosphorus, total Kjeldahl nitrogen and major constituents (sodium, potassium, calcium, magnesium, chloride, silicate, alkalinity and sulfate). Laboratory analyses were performed using either a Technicon Industrial Systems II AutoAnalyzer or a Perkin Elmer Model 306 Atomic Absorption Spectrophotometer. The specific analytical methods used for each of the analyses (Appendix B) were recommended or approved by the U. S. Environmental Protection Agency or the American Public Health Association.

Statistical Analysis

The statistical analyses presented in this report were performed using the SPSS statistical package (Nie et al, 1975) available at the Florida State University. Analyses of variance (ANOVA's) were done using a fixed effects model (Model I) with a factorial design. The assumption necessary for using the ANOVA procedure is independent observations which are random samples from normally distributed populations with equal variances. All tests of significance were performed at the .05 significance level, unless otherwise noted.

Loading Calculations

Annual nutrient loadings from the C-51, Hillsboro, North New River and Tamiami Canals were calculated using the following formula:

$$La = \sum_{i=1}^{m} \sum_{i=1}^{n} Q_{sp} \frac{(C_1 + C_2)}{2}_{n}$$

where

L_a = Annual nutrient load from the basin

m = Number of months for which the basin flow was positive

n = Number of sampling periods in a given month

Q_{sp} = Basin flow from first sampling date to the day prior to the next sampling date

C_1 = Concentration of nutrient constituent on 1st sampling date

C_2 = Concentration of nutrient constituent on 2nd sampling date

The basin flow Q_{sp} was calculated by subtracting any inflow from outside the basin, e.g. S-5AE, from the total discharge of the basin. Months during which there were negative basin flows the basin load was taken to be zero rather than negative. All hydrology data were taken from the unpublished records of the South Florida Water Management District.

RESULTS

The results of this study are presented separately for each of the four canals. For the purpose of statistical analysis and the presentation of results, average monthly values rather than individual sampling date values are used.

Western C-51

Temperature and Dissolved Oxygen. As could be expected, temperature in western C-51 followed a distinct seasonal trend (Fig. 6). The highest temperature (28.3^{o} C) occurred in July 1974 and the lowest (17.6^{o} C) was in December. July 1975 temperatures ranged 1 to 3 degrees centigrade below those in July 1974. The range of temperatures during the entire study was only 11° C.

Dissolved oxygen concentrations in western C-51 showed a strong seasonal trend (Fig. 7) with higher concentrations in the dry season than in the wet season. Vertical stratification of dissolved oxygen was not evident, indicating that the canal was mixed. Since temperature has an effect on the saturation concentration of oxygen it is important to look at the percent of saturation for a given dissolved oxygen concentration. The corresponding plot of percent saturation (Fig. 7) is essentially parallel to the curve for dissolved oxygen concentrations, both curves being the highest in March and lowest in July 1974.

pH. The pH values (Fig. 8) in western C-51 ranged from a low of 6.38 units in June 1975 at Station WPB-22.0 to a high of 7.75 units in June 1974 at Station WPB-12.0. Seasonal trends are not evident in pH values nor are there any significant differences between stations.

Alkalinity. The alkalinities measured during this study were generally high (Fig. 9) ranging from a low of 2.57 meq/l or 128 mg/l $CaCO_3$ in November to a high of 4.86 meq/l or 243 mg/l $CaCO_3$ in June 1974. Again, as with many of the other parameters, no distinct seasonal patterns were evident in the alkalinity levels during this study.

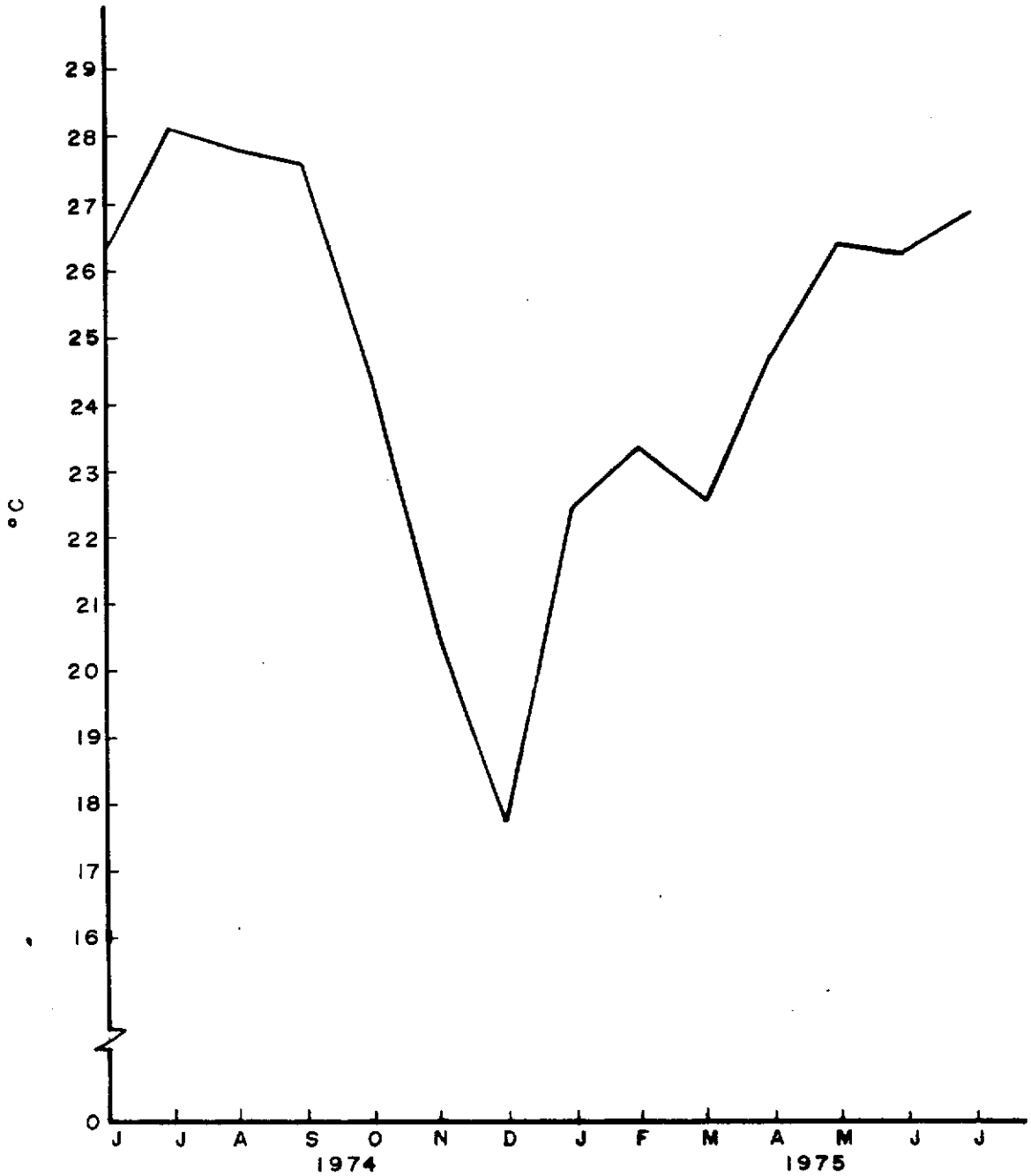

Figure 6 TEMPERATURES IN WESTERN C-51

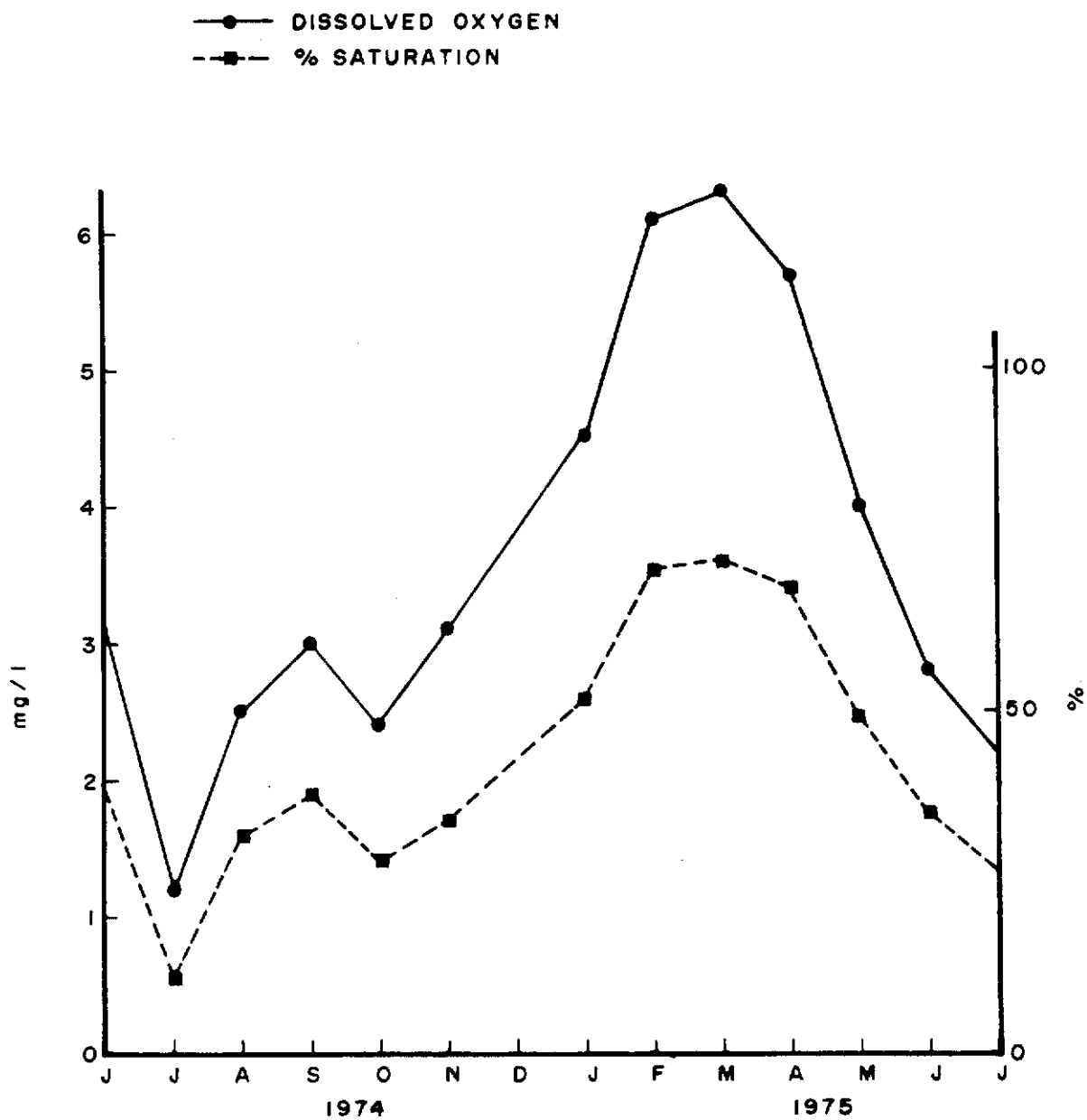

Figure 7 DISSOLVED OXYGEN CONCENTRATIONS AND PERCENT OF SATURATION IN WESTERN C-51

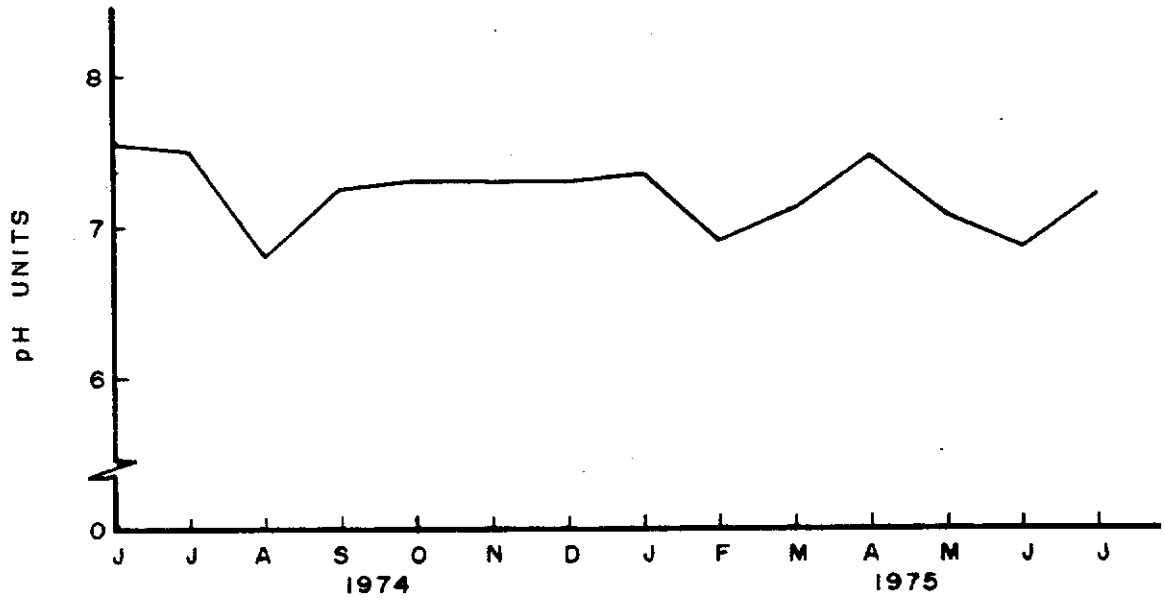

Figure 8 pH IN WESTERN C-51

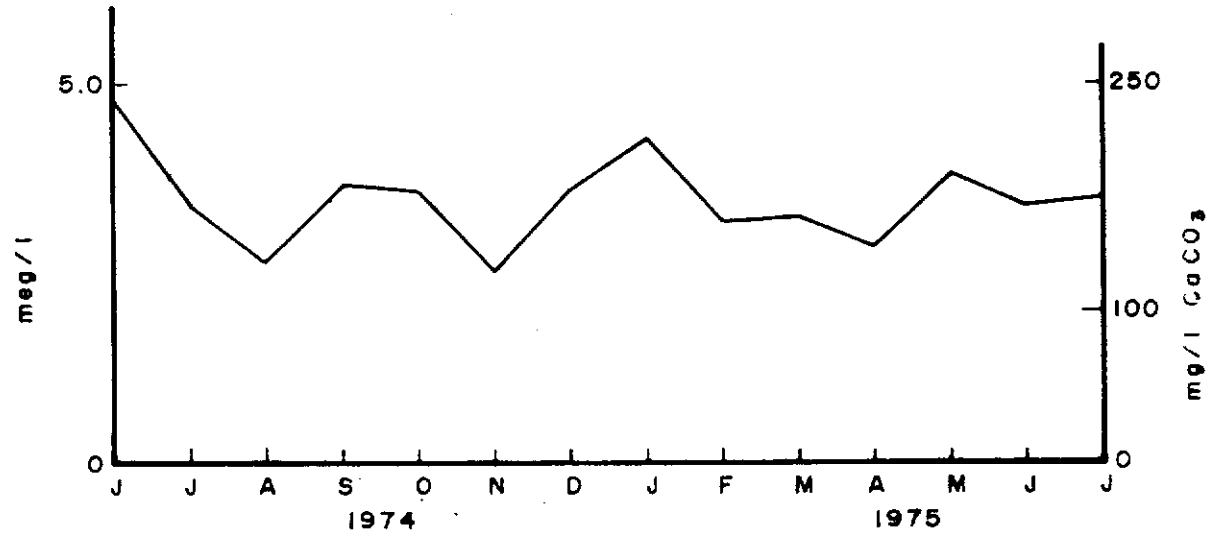

Figure 9 ALKALINITIES IN WESTERN C-51

Conductivity. When averaged over all stations for each month, conductivity values (Fig. 10) do show a fairly distinct seasonal trend. Generally, conductivities tended to be highest at the end of the dry season and the beginning of the wet season with decreasing values late in the wet season. The range of conductivities varied by a factor of 3 during the study period from a high of 1350 μmhos/cm in June 1974 to a low in August 1974 of 404 μmhos/cm.

Major Constituents. This category includes the cations sodium, potassium, calcium and magnesium, and the chloride anion. The concentrations of major cations do not have any distinct pattern of variation (Figs. 11 through 13), with the exception of magnesium. Magnesium concentrations (Fig. 14) are lower during the wet season, tending to increase during the dry season.

Chloride concentrations (Fig. 15) in the western C-51 basin show a great deal of variability from month to month but no general seasonal trend. The highest chloride concentration measured during the study period (179 mg/l) was in June 1974 while the lowest concentration (36.4 mg/l) was in August 1974.

Phosphorus. Concentrations of total and ortho-phosphorus in the western C-51 basin varied considerably from month to month during the study period (Figs. 16 and 17). The highest monthly concentration of total phosphorus (0.319 mg/l) occurred in December at Station WPB-22.0, while the lowest monthly concentration (0.028 mg/l) was also in the same month at Station WPB-13.5. Ortho-phosphate concentrations followed a similar, but not identical, trend. The concentrations of ortho-phosphate were the highest (0.217 mg/l) in July 1975 at Stations WPB-22.0 and WPB-18.0, while the lowest concentrations (0.011 mg/l) were at Stations WPB-13.5 and WPB-12.0 in May and February respectively.

The statistical significance of the apparent differences in the concentrations of both total and ortho-phosphorus between months and stations, was tested using analysis of variance (ANOVA) techniques. A two way analysis of variance, using

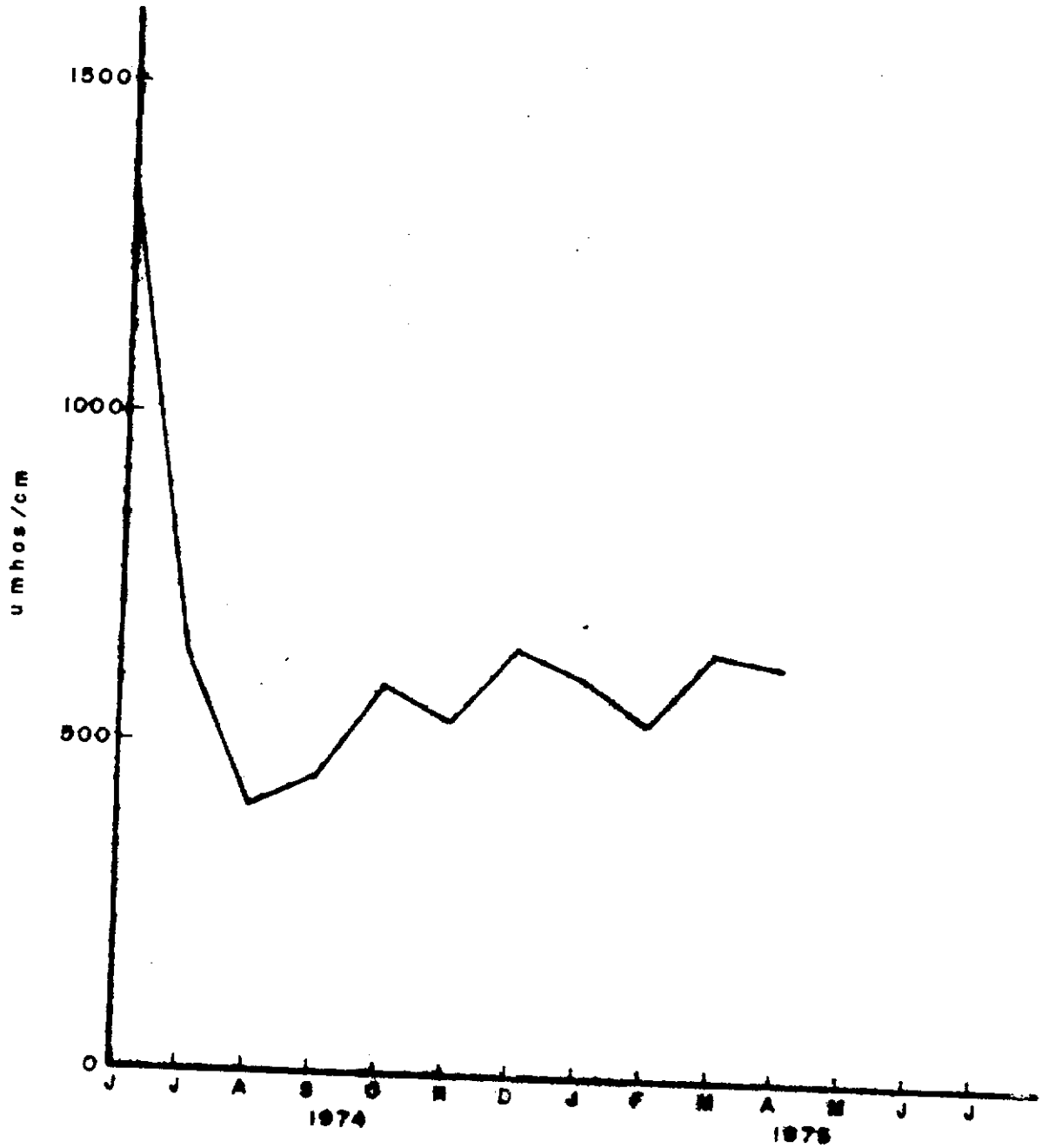

Figure 10 CONDUCTIVITIES IN WESTERN C-51

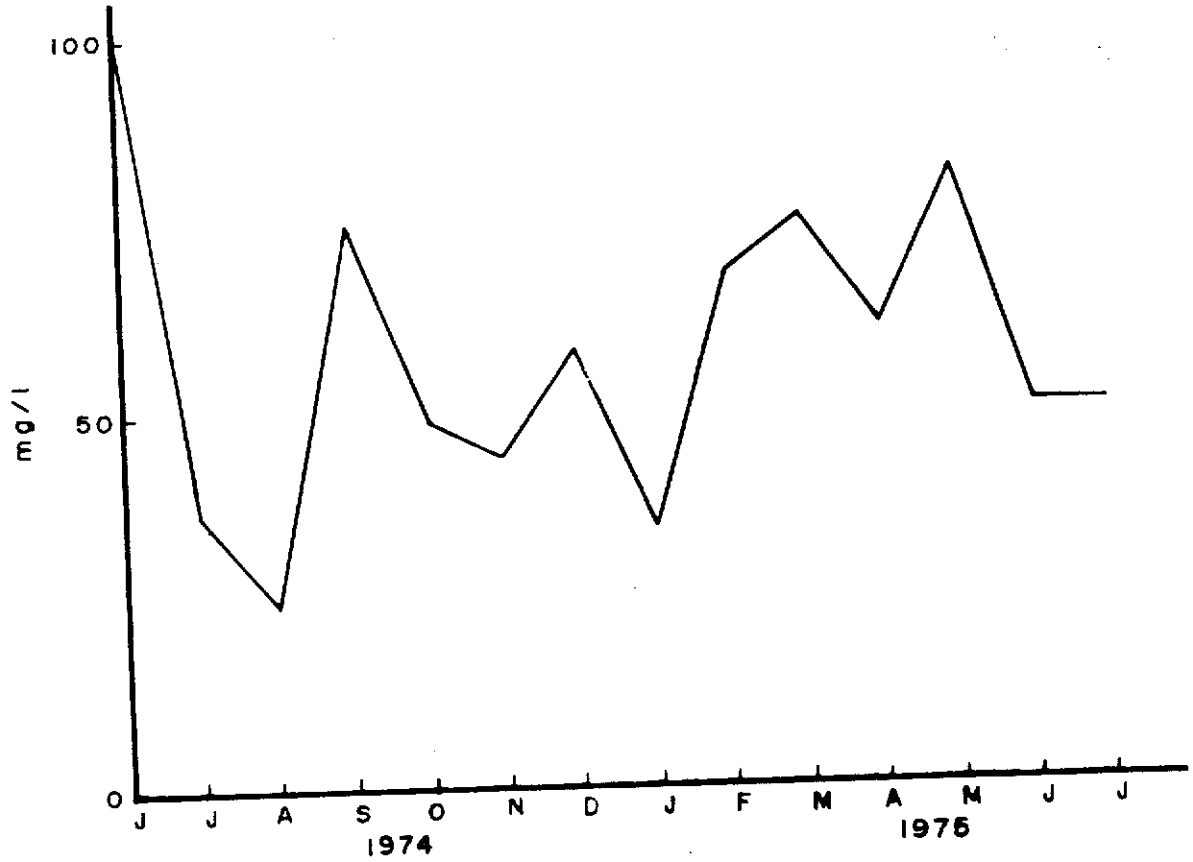

Figure 11 SODIUM CONCENTRATIONS IN WESTERN C-51

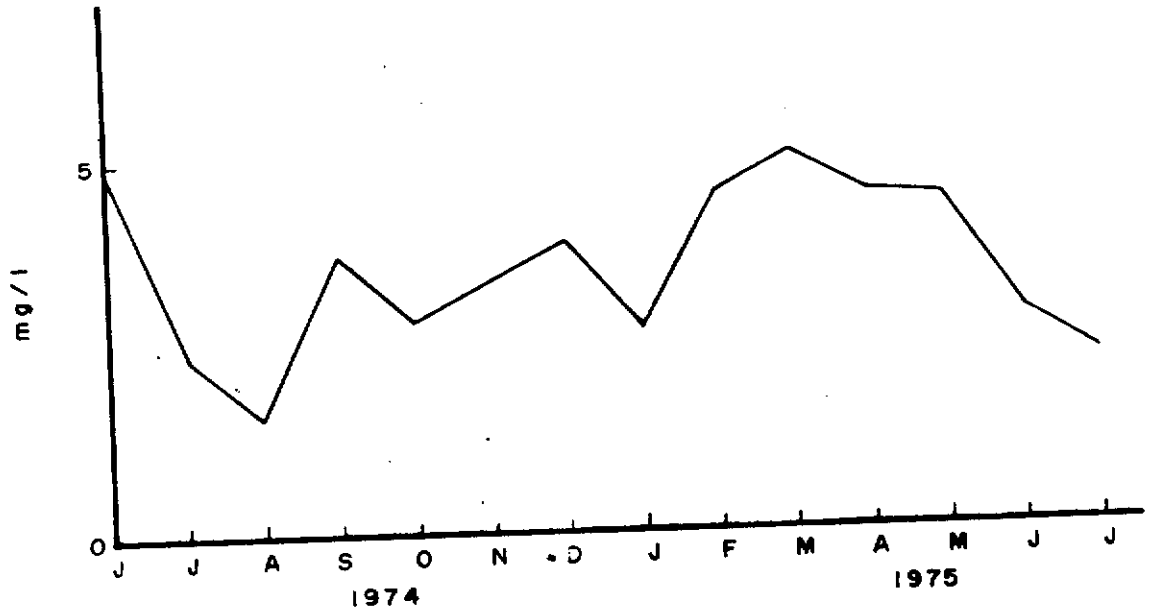

Figure 12 POTASSIUM CONCENTRATIONS IN WESTERN C-51

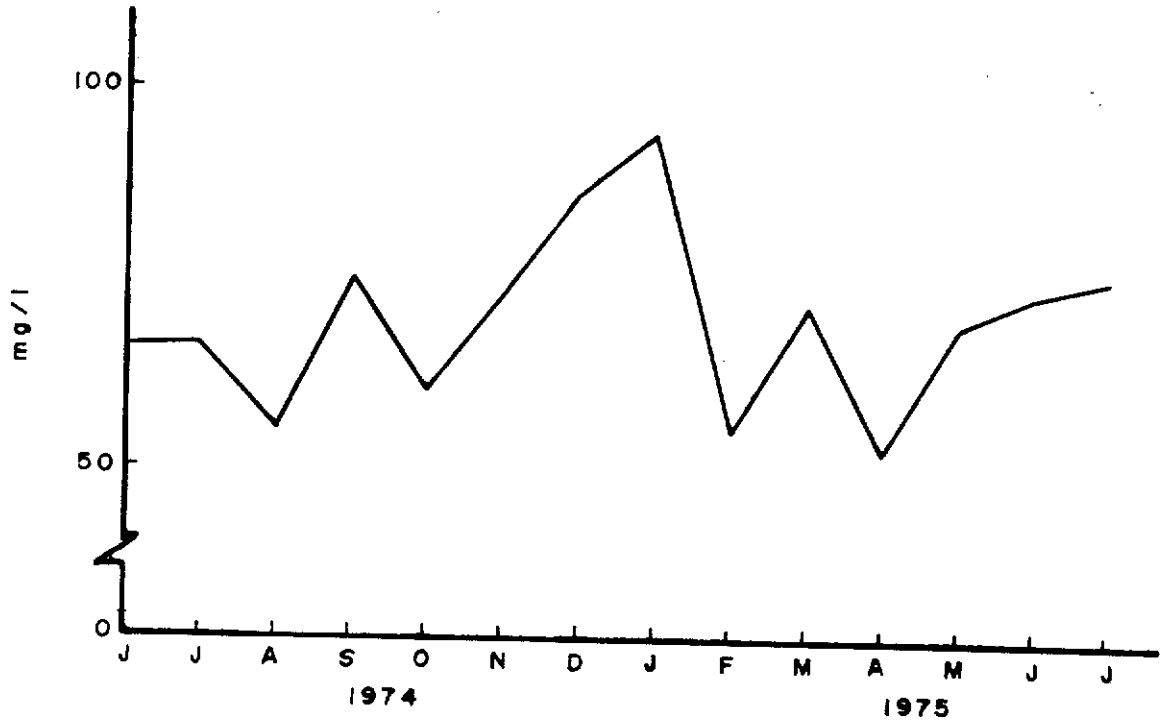

Figure 13 CALCIUM CONCENTRATIONS IN WESTERN C-51

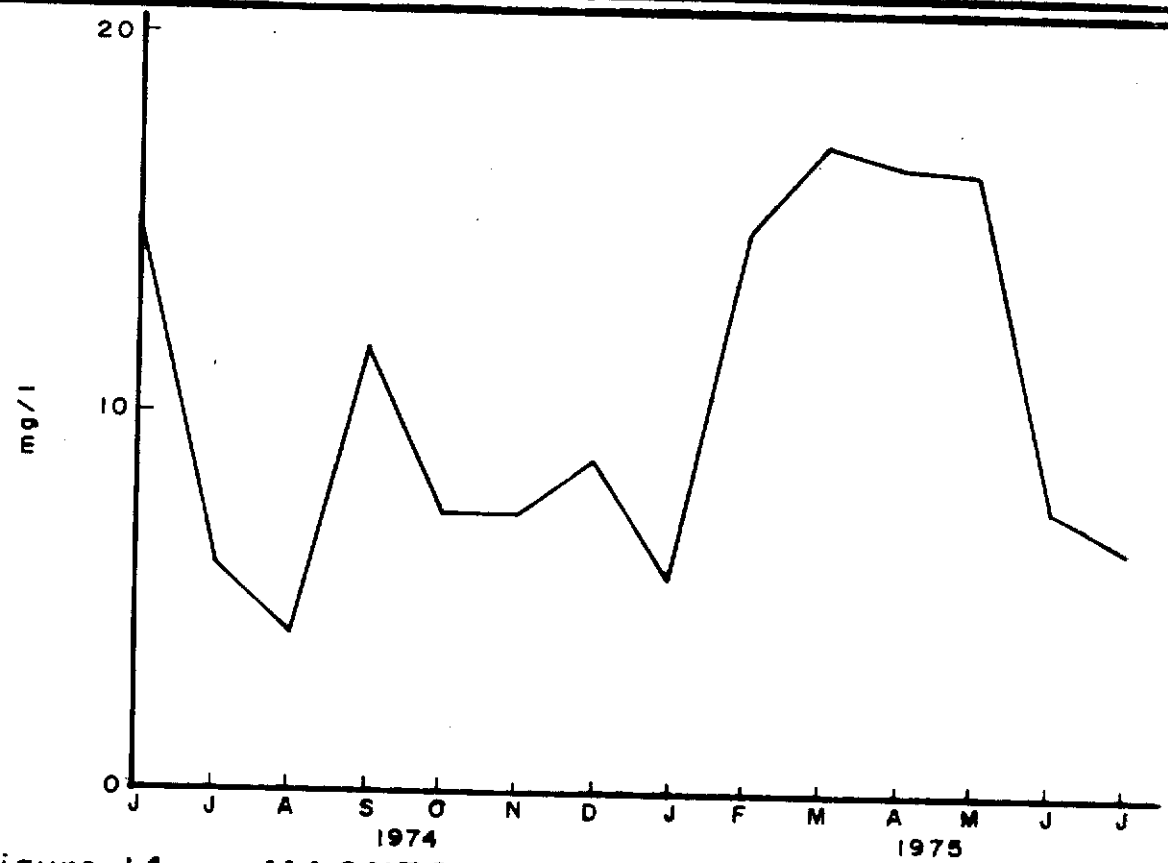

Figure 14 MAGNESIUM CONCENTRATIONS IN WESTERN C-51

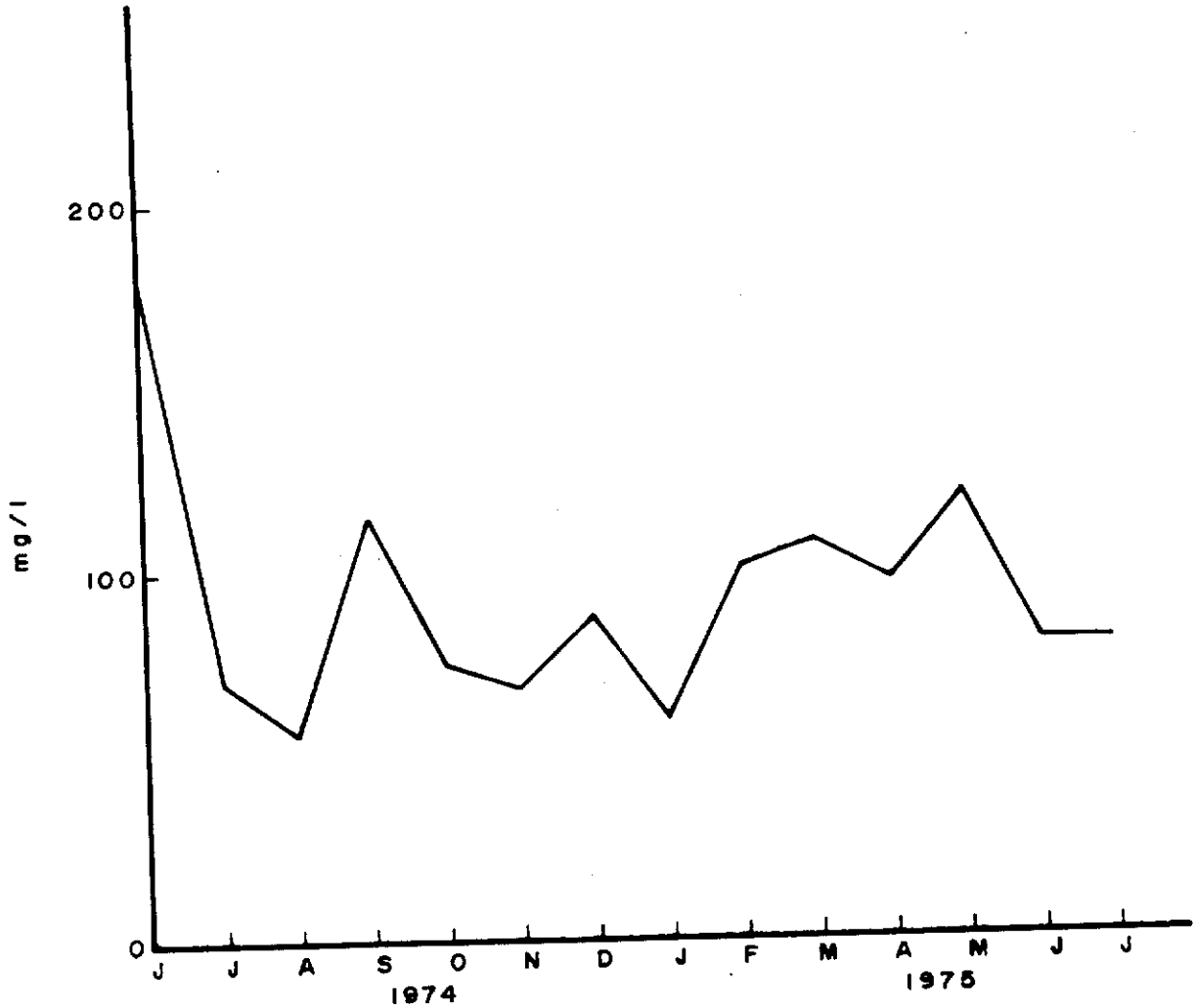

Figure 15 CHLORIDE CONCENTRATIONS IN WESTERN C-51

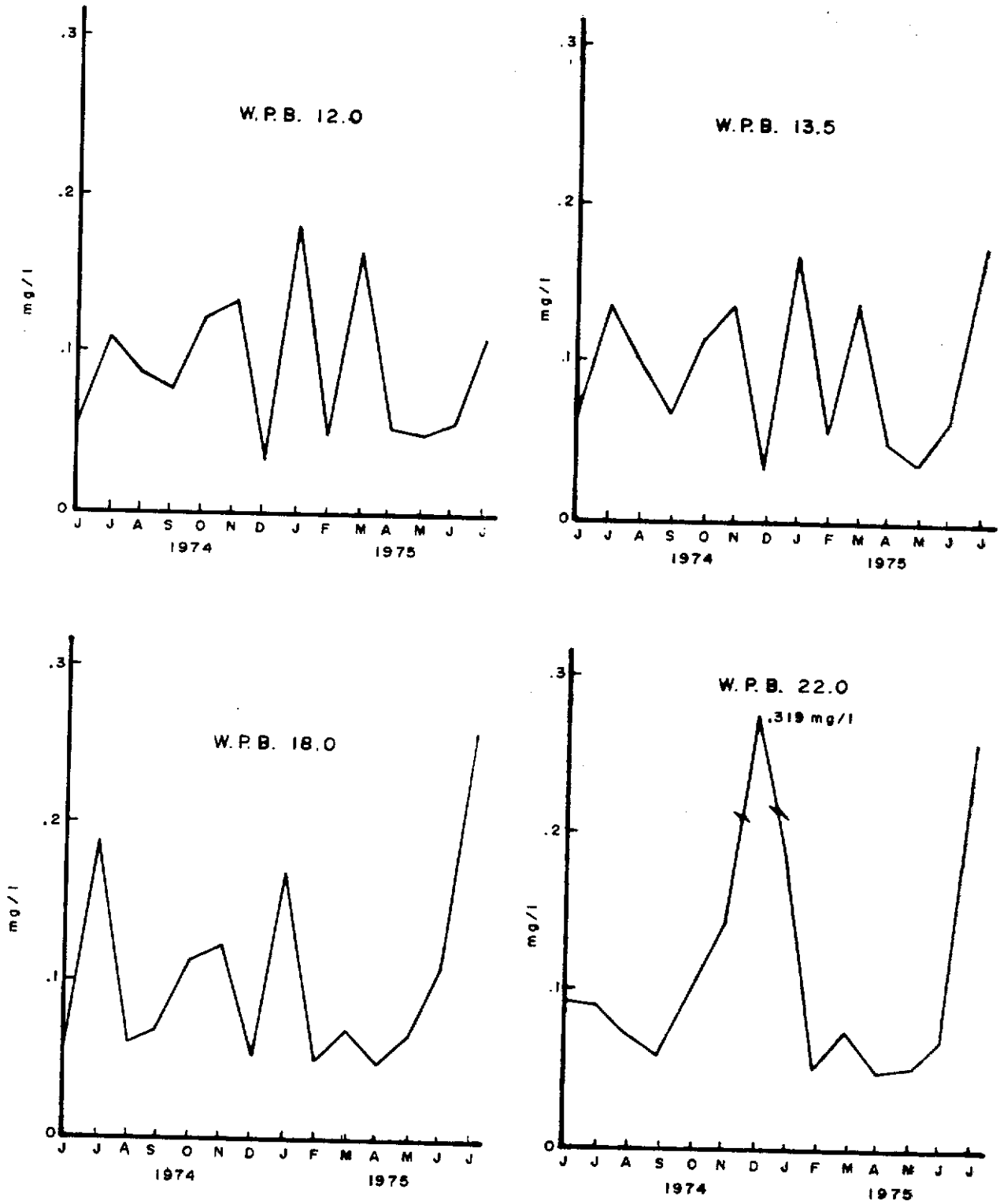

Figure 16 TOTAL PHOSPHORUS CONCENTRATIONS IN WESTERN C-51

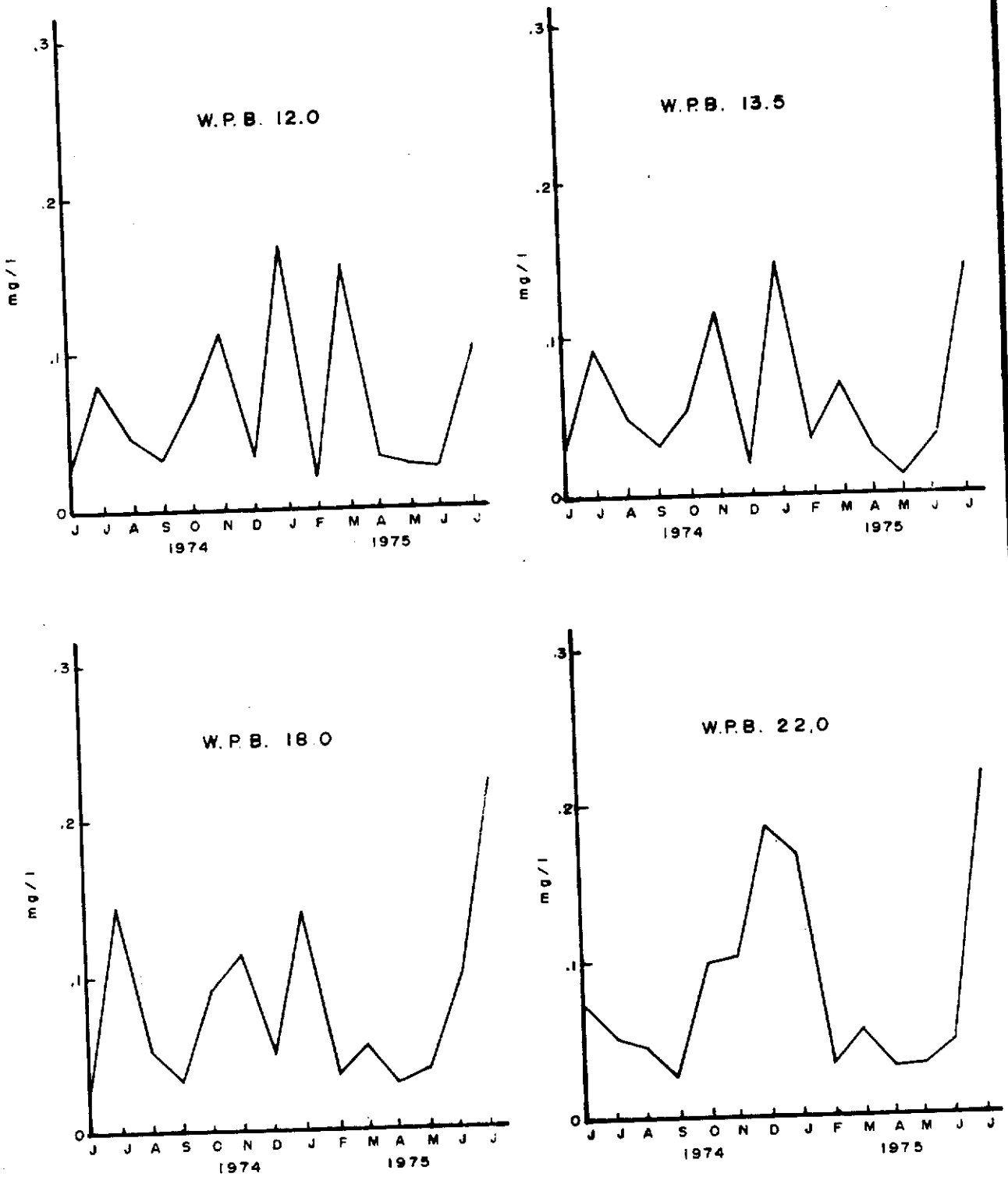

Figure 17 ORTHO-PHOSPHORUS CONCENTRATIONS IN WESTERN C-51

the 14 months of the study as one factor and the four sampling stations as a second factor, indicates that there are significant differences between months, but not between stations (Appendix C). Because there were no significant differences in either the total or ortho-phosphate concentrations between stations, data from all of the stations was pooled and monthly concentrations for the canal as a whole were analyzed further.

Using Duncan's multiple range test, months in which concentrations were not significantly different, at the .05 level of significance, have been grouped together (Tables 2 and 3). Months connected by a single line, in the tables, did not have significantly different concentrations. The order, from left to right, of months in the table reflects the relative concentration of the listed parameter, i.e. the lowest concentration of total phosphorus (0.05 mg/l) was in February. When data for the stations are averaged for the entire month, the highest and lowest concentrations in December (Fig. 16) are no longer the extremes.

Nitrogen. The monthly concentrations of both total nitrogen and total dissolved inorganic nitrogen in the western C-51 basin also varied considerably from one month to another during the study period (Figs. 18 and 19). The variation of total nitrogen from station to station for a given month appears to be greater than that for the dissolved inorganic nitrogen forms.

The highest concentration of total nitrogen (7.56 mg/l) was at Station WPB-22.0 in June 1974, while the lowest concentration was 0.67 mg/l at the same station in January. The concentration of dissolved inorganic nitrogen species ranged from a high of 3.65 mg/l in December at Station WPB-22.0 to a low of 0.05 mg/l in January at Station WPB-12.0.

Numerous missing data for both total nitrogen and dissolved inorganic nitrogen made a two way, station by month, analysis of variance for these parameters impossible. The only nitrogen form with sufficient data for this

TABLE 2. RESULTS OF DUNCAN'S MULTIPLE RANGE TEST FOR DIFFERENCES IN TOTAL PHOSPHORUS CONCENTRATIONS BY MONTH ON WESTERN C-51

(.050)[1] Feb.	(.050) April	(.051) May	(.065) June 74	(.068) Sept.	(.076) June 75	(.077) August	(.108) Dec.	(.112) Oct.	(.113) March	(.131) July 74	(.133) Nov.	(.176) Jan.	(.184) July 75

[1]Numbers in parentheses are concentrations for the respective months.

TABLE 3. RESULTS OF DUNCAN'S MULTIPLE RANGE TEST FOR DIFFERENCES IN ORTHO-PHOSPHORUS CONCENTRATIONS BY MONTH ON WESTERN C-51

(.027)[1] May	(.028) Feb.	(.029) Sept.	(.030) April	(.034) June 74	(.048) August	(.050) June 75	(.069) Dec.	(.078) Oct.	(0.85) March	(.092) July 74	(.111) Nov.	(.150) July 75	(.154) January

[1]Numbers in parentheses are concentrations for the respective months.

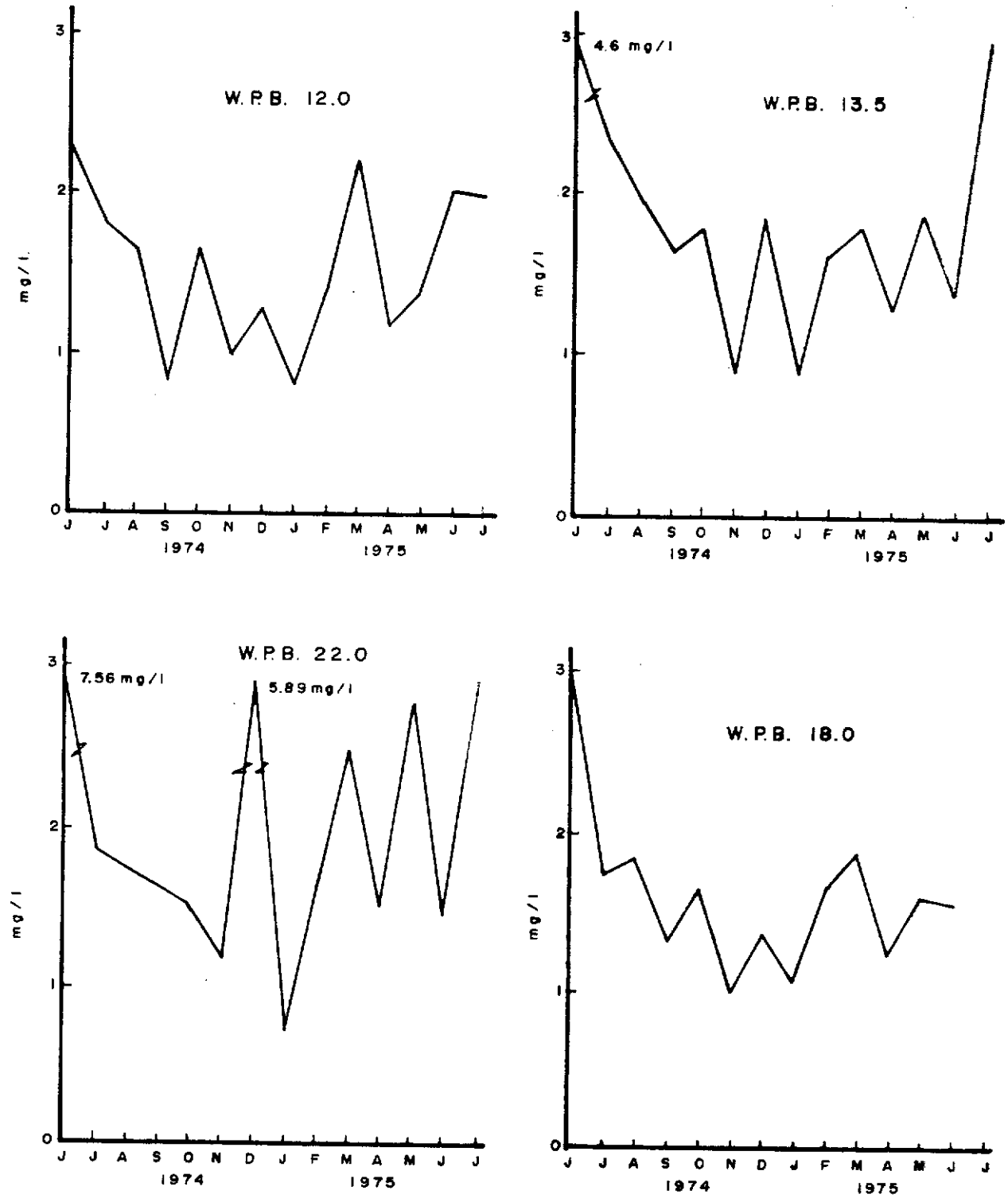

Figure 18 TOTAL NITROGEN CONCENTRATIONS IN WESTERN C-51

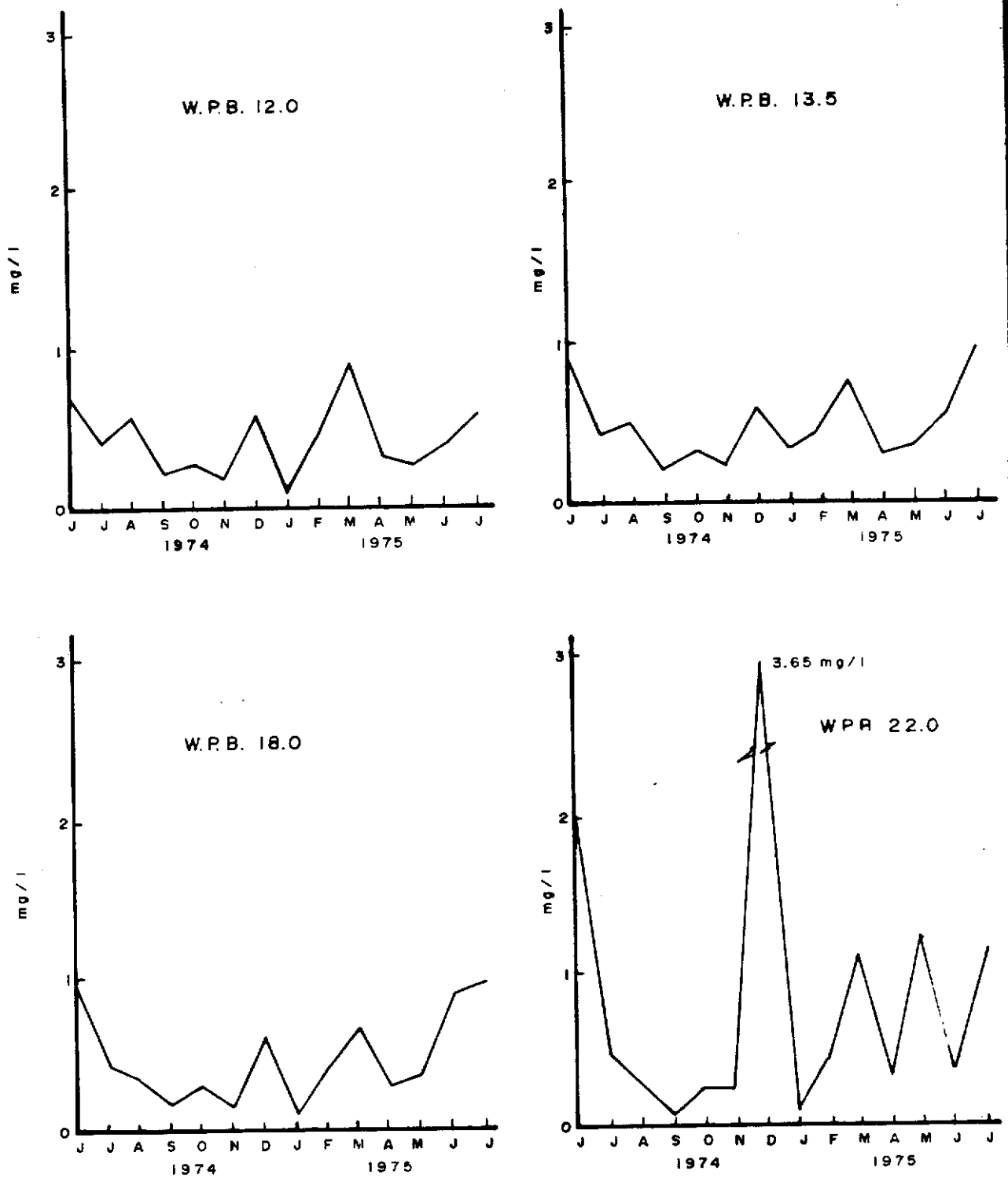

Figure 19 DISSOLVED INORGANIC NITROGEN CONCENTRATIONS IN WESTERN C-51

type of analysis of variance was NO_x. The analysis of variance using NO_x as the dependent variable (Appendix C) indicated that the concentrations did vary significantly between months. When all months were considered, a significant difference in NO_x concentrations was also found between the different stations (Appendix C). Duncan's multiple range test, at the .05 level of significance, was again used to group months (Table 4) and stations (Table 5) in which NO_x concentration of NO_x in the western basin was highest (1.14 mg/l) in December and lowest (0.10 mg/l) in September. Over the entire study period NO_x concentrations were significantly higher (Table 5) at Station WPB-22.0 (0.571 mg/l) than at either Station WPB-18.0 (0.256 mg/l) or WPB-12.0 (0.259 mg/l).

Hillsboro Canal

Temperature and Dissolved Oxygen. The Hillsboro Canal had a temperature range of 9.3° C (Fig. 20) from the highest temperature (27.9° C) in April to the lowest (18.6° C) in December. There was no consistent variation of temperature with depth over the entire study period.

Dissolved oxygen concentrations (Fig. 21) at the surface were consistently higher than at the lower depths, especially during the wet season. The highest dissolved oxygen concentration at the surface was 6.55 mg/l in February and the lowest was 2.04 mg/l in July 1975. For all depths from 1 meter to the bottom the highest dissolved oxygen concentration (5.15 mg/l) occurred in May and the lowest (0.55 mg/l) in July 1975.

Averaged over all depths, dissolved oxygen concentrations (Fig. 22) equaled or exceeded 4.0 mg/l only from January through April. Dry season concentrations of dissolved oxygen tended to be higher than the concentrations during the wet season. Values for percent of saturation for dissolved oxygen (Fig. 22) show that only during the dry season months from February through April were dissolved oxygen concentrations in excess of 50% saturation.

TABLE 4. RESULTS OF DUNCAN'S MULTIPLE RANGE TEST FOR DIFFERENCES IN NO_x CONCENTRATIONS BY MONTH FOR WESTERN C-51.

(.10)[1]	(.11)	(.13)	(.22)	(.23)	(.24)	(.25)	(.26)	(.36)	(.40)	(.64)	(.87)	(1.14)
September	January	November	October	June 75	August	July 75	April	February	May	March	June 74	December

TABLE 5. RESULTS OF DUNCAN'S MULTIPLE RANGE TEST FOR DIFFERENCES IN NO_x CONCENTRATIONS BY STATION FOR WESTERN C-51.

(.26)[2]	(.26)	(.30)	(.57)
WPB-18.0	WPB-12.0	WPB-13.5	WPB-22.0

1 Table 4 - Numbers in parentheses are concentrations for the respective months.

2 Table 5 - Numbers in parentheses are concentrations for the respective stations.

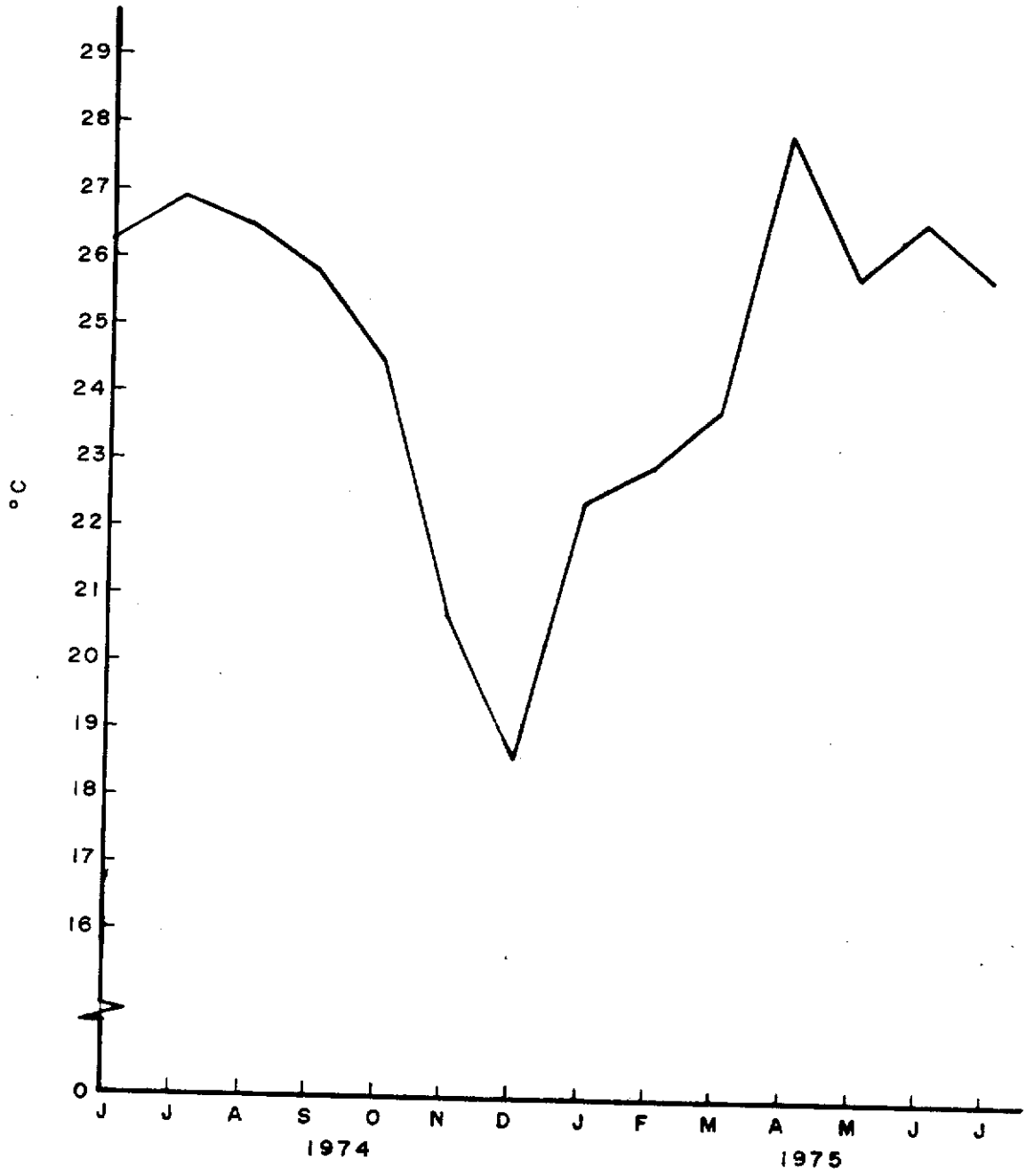

Figure 20 TEMPERATURES IN THE HILLSBORO CANAL

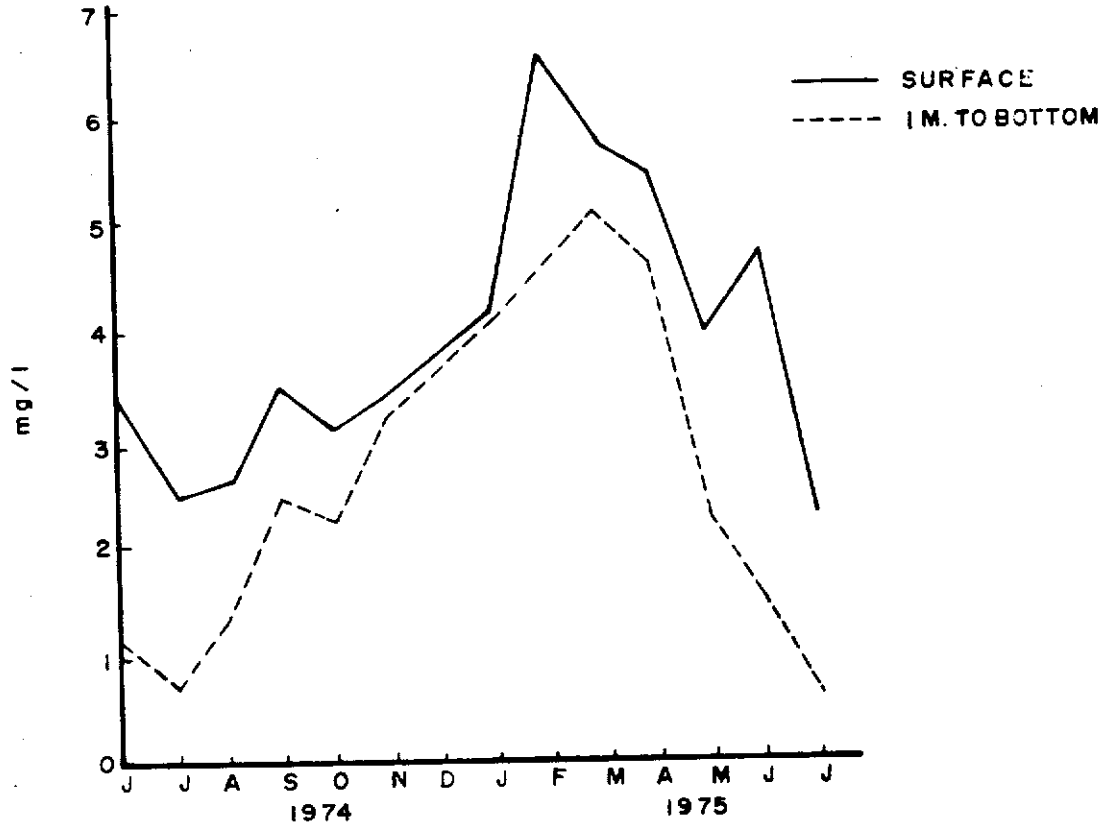

Figure 21 DISSOLVED OXYGEN CONCENTRATIONS AT THE SURFACE AND LOWER DEPTHS IN THE HILLSBORO CANAL

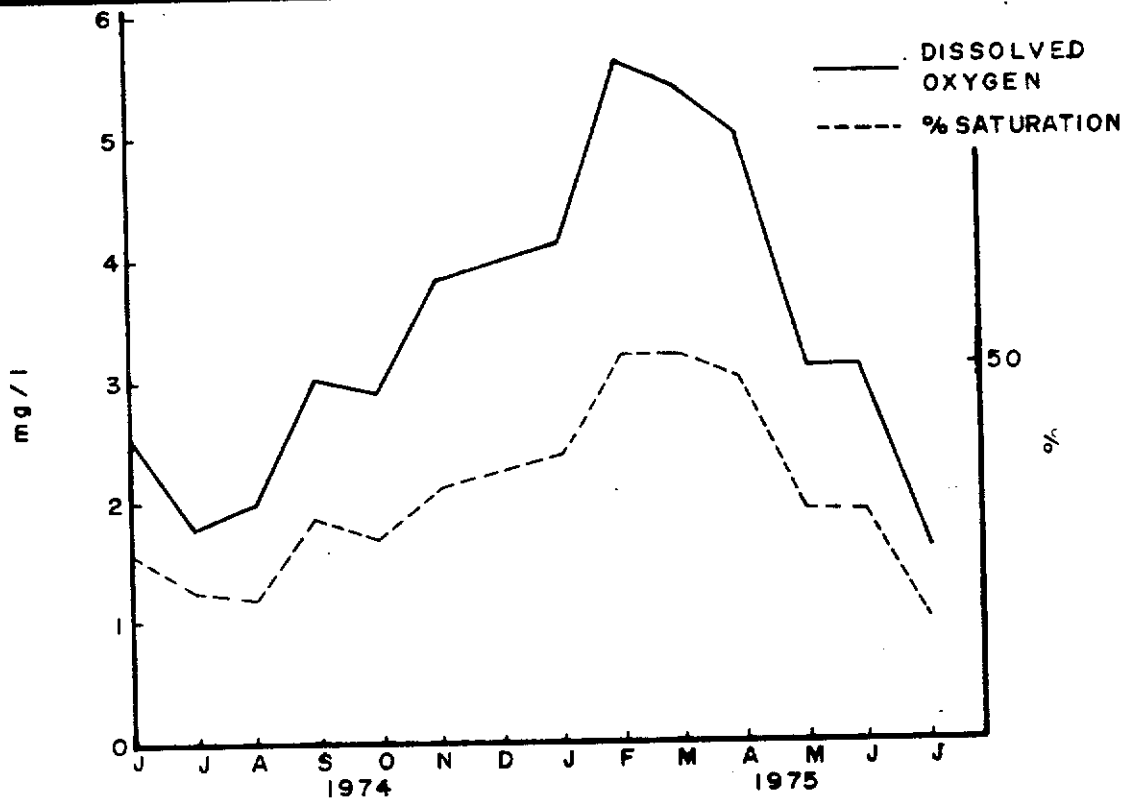

Figure 22 DISSOLVED OXYGEN CONCENTRATIONS AND PERCENT SATURATION FOR ALL DEPTHS ON THE HILLSBORO CANAL

pH. The pH on the Hillsboro Canal (Fig. 23) varied a total of 1.2 pH units during the entire study. If August pH values are not included, the entire range of variation is only 0.6 pH units. Only in August, February and May were pH values below 7.00 encountered. The highest pH (7.48 units) occurred in July 1974 and the lowest, with the exception of 6.28 in August, was 6.89 units in May.

Alkalinity. The alkalinity of the Hillsboro Canal was high throughout the study (Fig. 24). November was the only month in which alkalinities were below 4.0 meq/l (200 mg/l $CaCO_3$). The highest alkalinity (5.11 meq/l or 255.5 mg/l $CaCO_3$) occurred in April. A seasonal pattern was not evident for alkalinities, as they remained fairly stable.

Conductivity. Conductivity (Fig. 25) displayed a seasonal pattern very similar to sodium, magnesium and chloride. Conductivities tended to increase with the progression of the dry season. Sharp decreases were recorded in both February and April, but a general increase in the conductivity was still evident. The lowest conductivities during the study (542 μmhos/cm) occurred in September, the last month of the wet season. The highest conductivity value (1612 μmhos/cm) occurred in July 1975, the last month of the study. Conductivities in July 1975 were about 2 times greater than those in July 1974.

Major Constituents. Concentrations of both sodium and magnesium (Figs. 26 and 29) followed a distinct seasonal trend; increasing in concentration from the beginning (October) to the end (April) of the dry season. The highest sodium (91.5 mg/l) and magnesium (16.8 mg/l) concentrations occurred in April and the lowest (28.0 mg/l for sodium and 6.1 mg/l for magnesium) in July 1974. With the onset of the wet season in May, sodium and magnesium concentrations began to decrease.

Potassium concentrations did not show as strong a seasonal trend (Fig. 27) as did sodium and magnesium. The lowest concentration of potassium (2.57 mg/l)

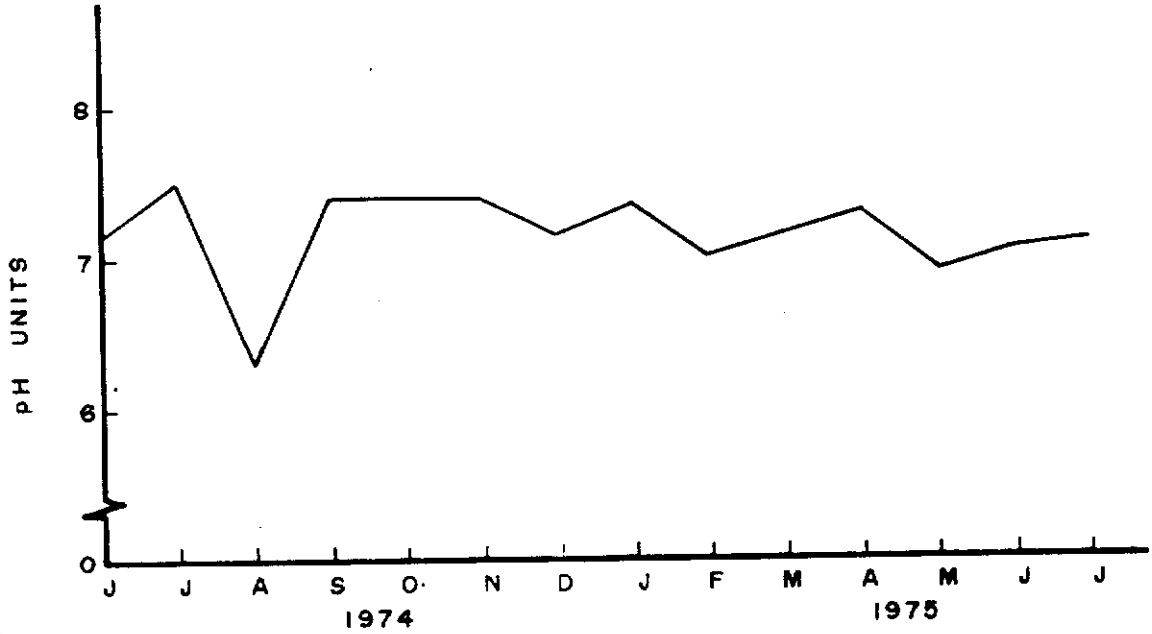

Figure 23 pH IN THE HILLSBORO CANAL

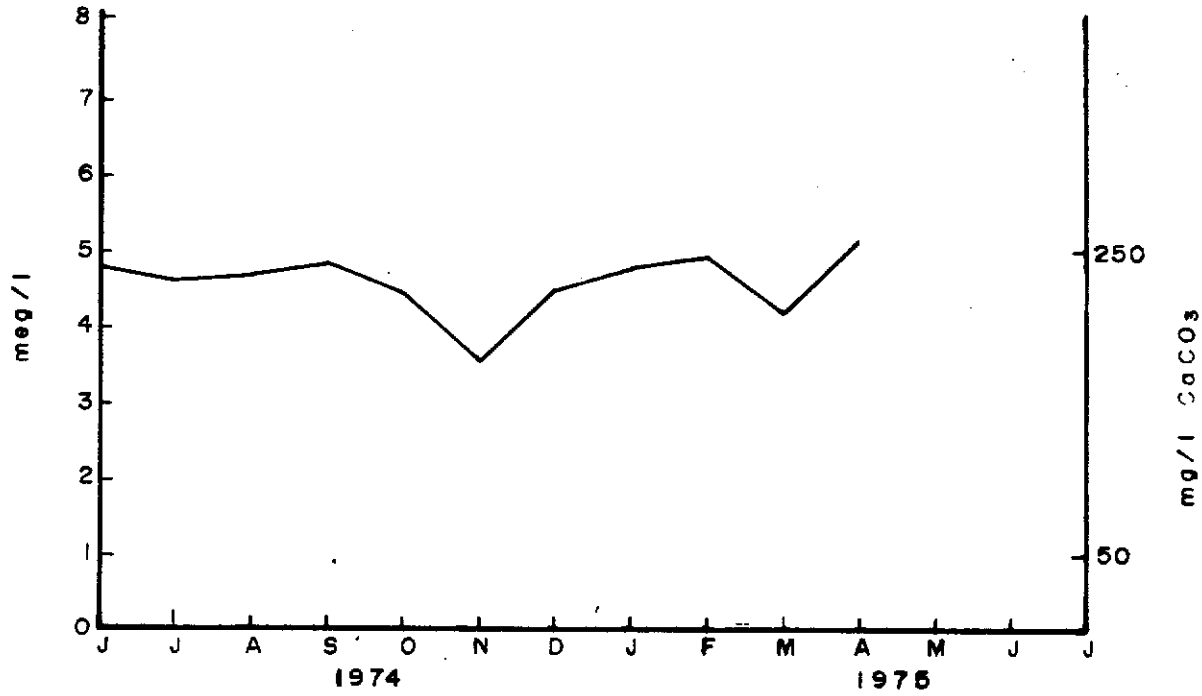

Figure 24 ALKALINITIES IN THE HILLSBORO CANAL

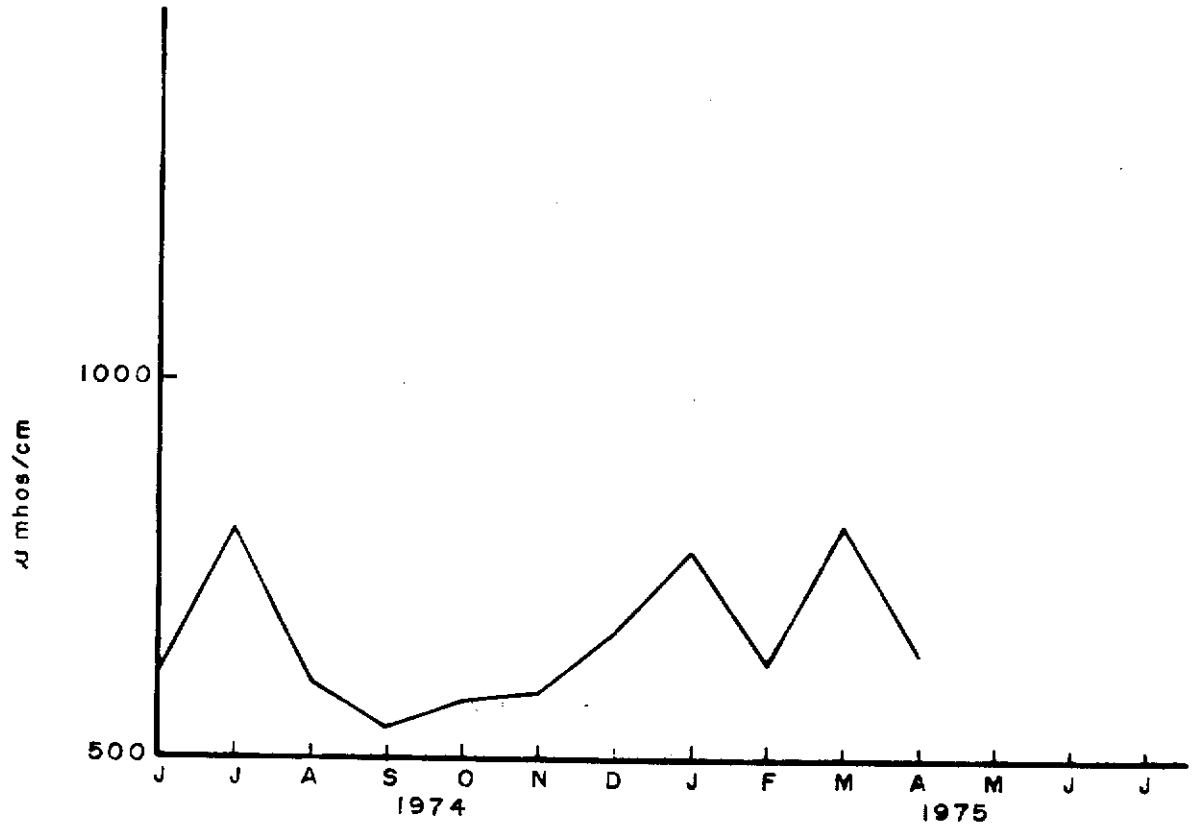

Figure 25 CONDUCTIVITIES IN THE HILLSBORO CANAL

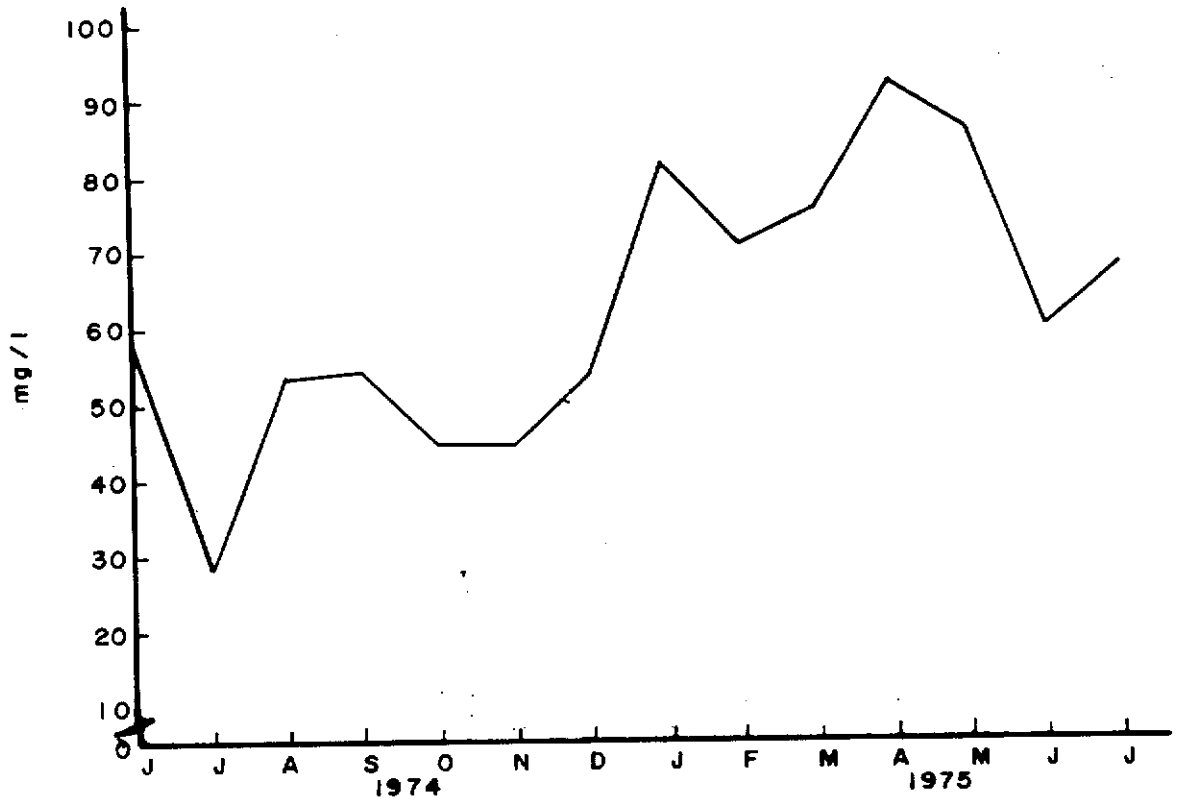

Figure 26 SODIUM CONCENTRATIONS IN THE HILLSBORO CANAL

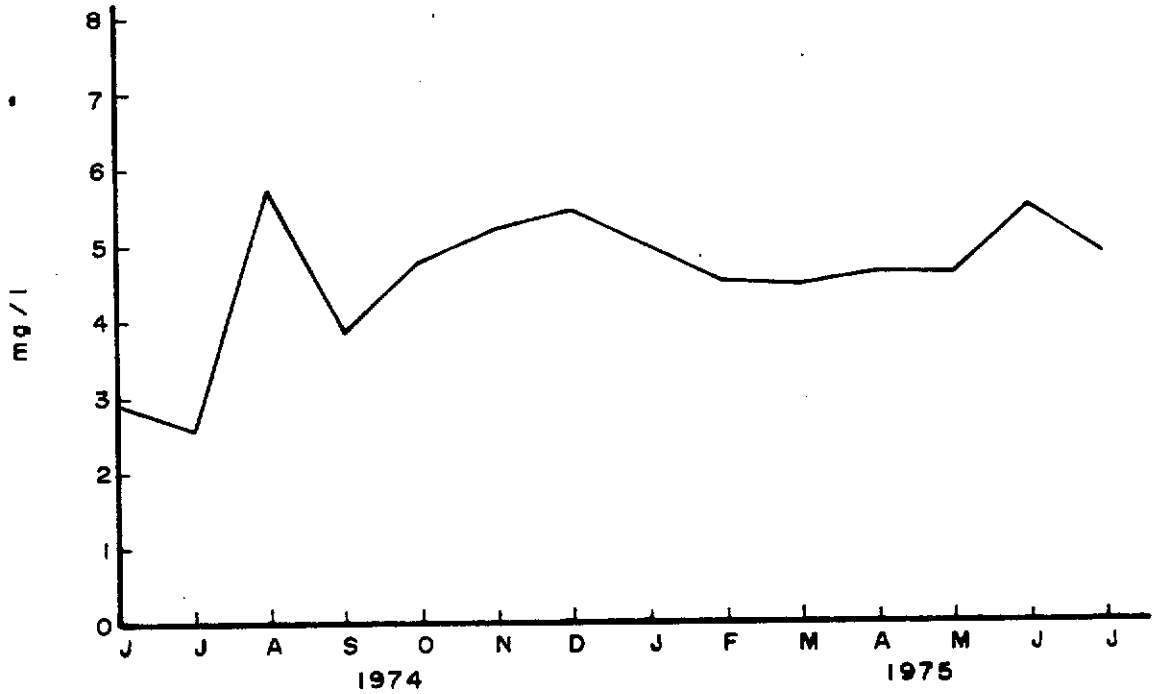

Figure 27 POTASSIUM CONCENTRATIONS IN THE HILLSBORO CANAL

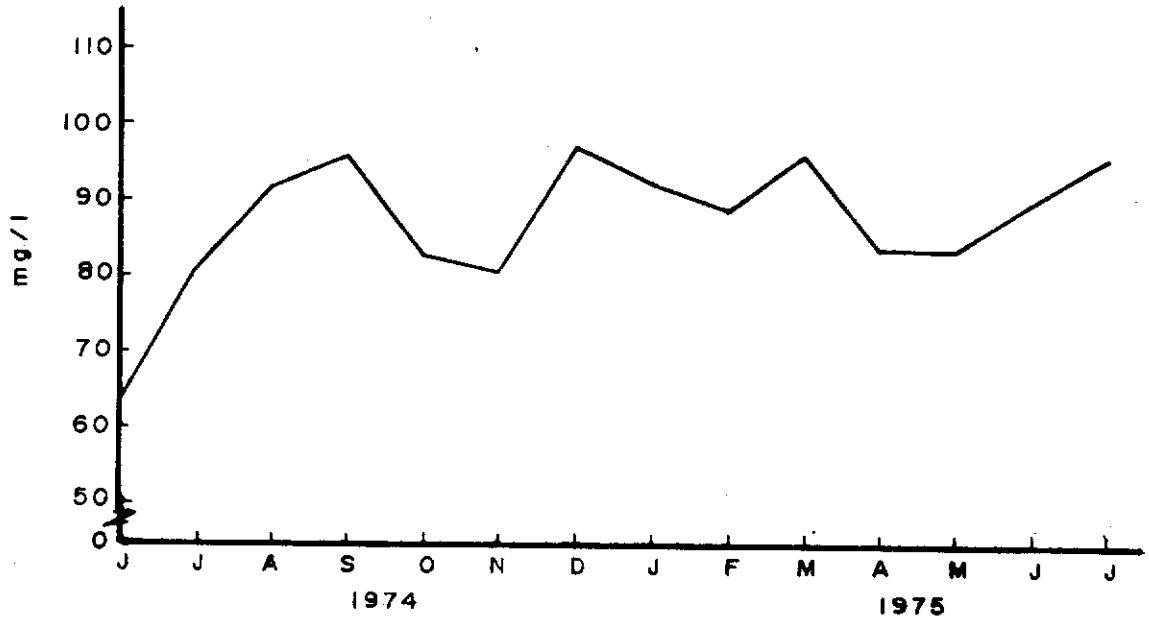

Figure 28 CALCIUM CONCENTRATIONS IN THE HILLSBORO CANAL

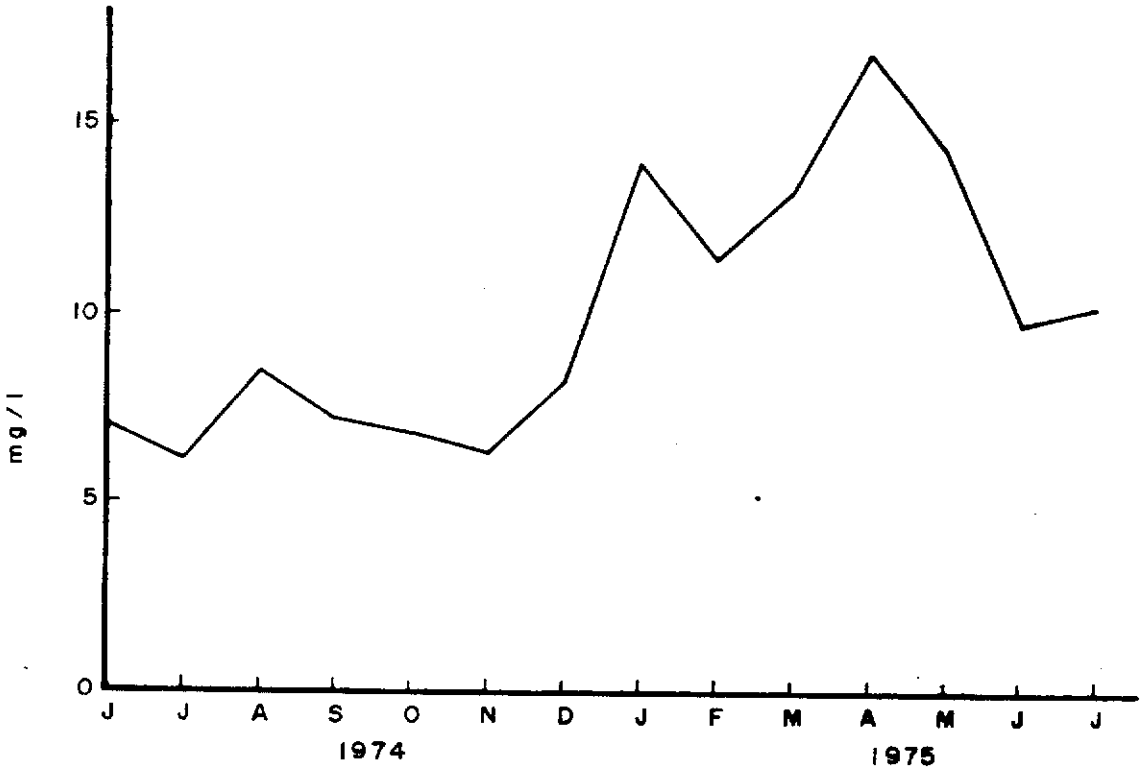

Figure 29 MAGNESIUM CONCENTRATION IN THE HILLSBORO CANAL

was in July 1974 and the highest (5.70 mg/l) in August. Increasing levels of potassium were not observed during the dry season.

Calcium (Fig. 28) tended to be somewhat more variable in concentration from month to month than the other cations. Calcium concentrations increased from 63.0 mg/l, the lowest concentration during the study period, to 95.1 mg/l as the 1974 wet season progressed. Throughout the entire dry season and the first few months of the 1975 wet season, calcium concentrations fluctuated with no apparent pattern from a low of 80.6 mg/l in November to a high of 96.5 mg/l in December.

The concentrations of chloride followed almost the same seasonal pattern (Fig. 30) as did sodium and magnesium. The lowest chloride concentration (70.3 mg/l) occurred at the end of the wet season, October, and the highest concentration (133.4 mg/l) at the end of the dry season in April.

Phosphorus. Station to station differences in both total and ortho-phosphorus concentrations on this canal were small; but a seasonal trend in phosphorus concentrations was evident (Figs. 31 and 32). Phosphorus concentrations were generally lower in the dry season (October through April) than in the wet season. The highest concentration of total phosphorus (0.263 mg/l) during the study period occurred at Station HBC-04.2 in August. At the same station in April the lowest concentration (0.027 mg/l) of total phosphorus occurred. Station HBC-00.0 in July 1975 had the highest concentrations, averaging 0.219 mg/l, of ortho-phosphorus. Higher concentrations of ortho-phosphorus were recorded, however their validity must be suspect because they exceeded total phosphorus concentrations. The lowest ortho-phosphorus concentrations (0.004 mg/l) were at Stations HBC-00.0 and HBC-01.0 and were near the analytical detection limit of 0.002 mg/l.

Differences in phosphorus concentrations between stations as well as between months were tested for statistical significance using the analysis of variance approach. The results of these analyses (Appendix C) indicate that both

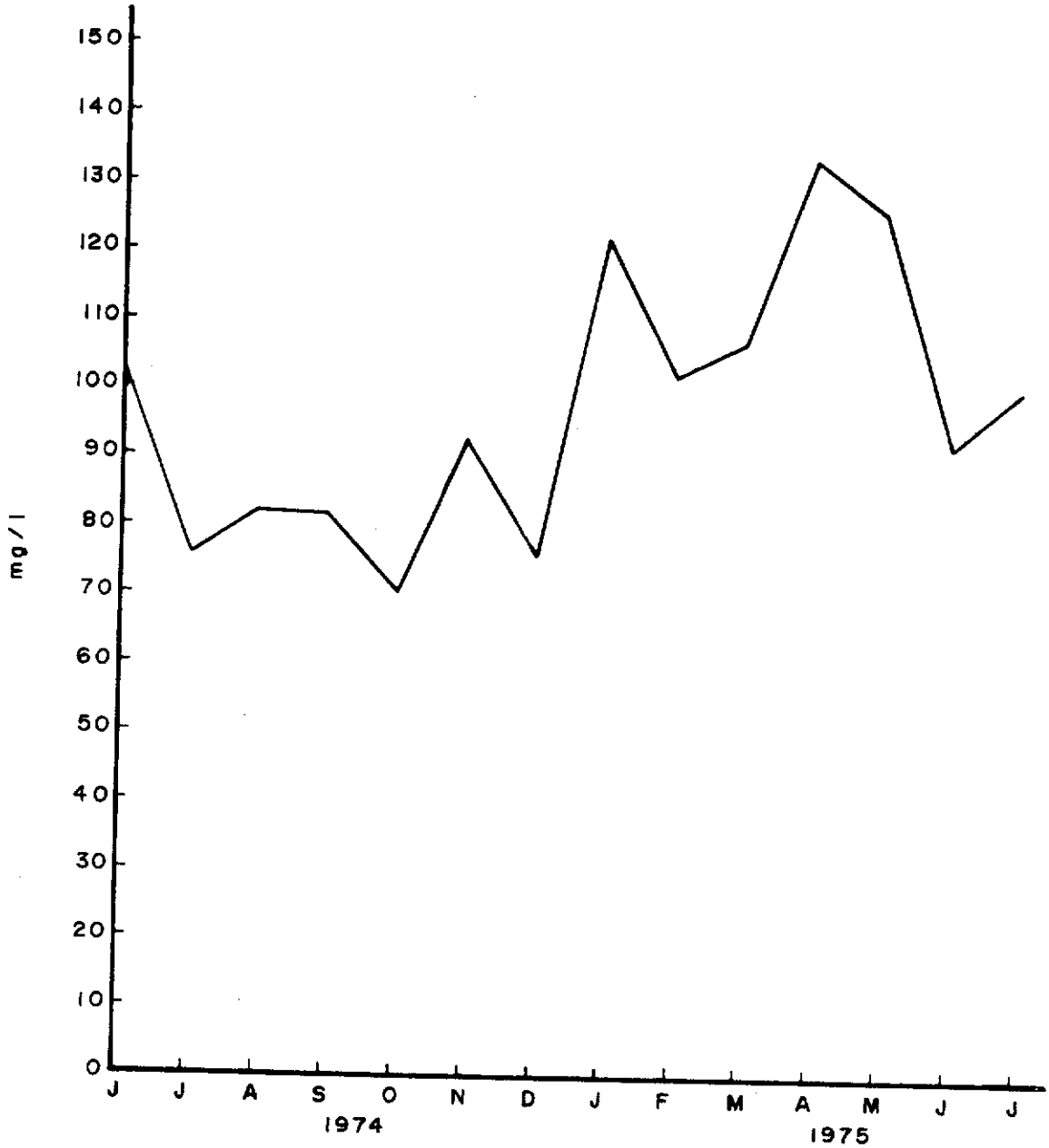

Figure 30 CHLORIDE CONCENTRATIONS IN THE HILLSBORO CANAL

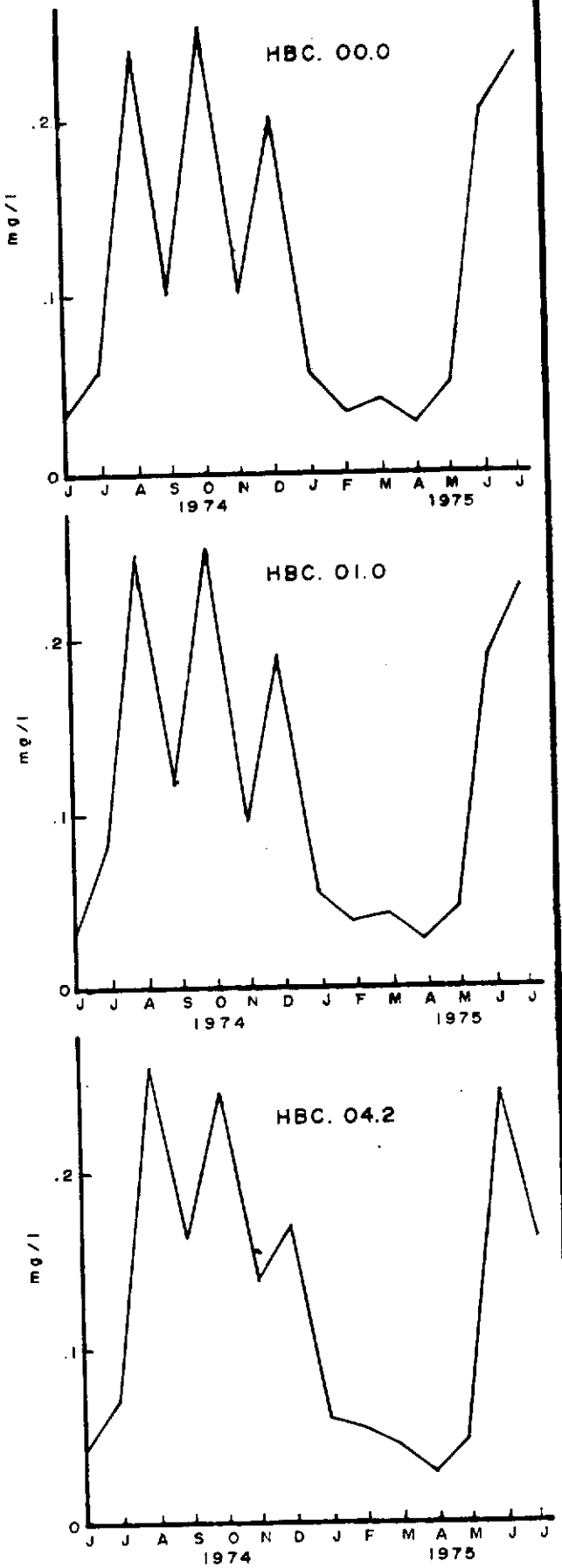

Figure 31 TOTAL PHOSPHORUS CONCENTRATIONS IN THE HILLSBORO CANAL

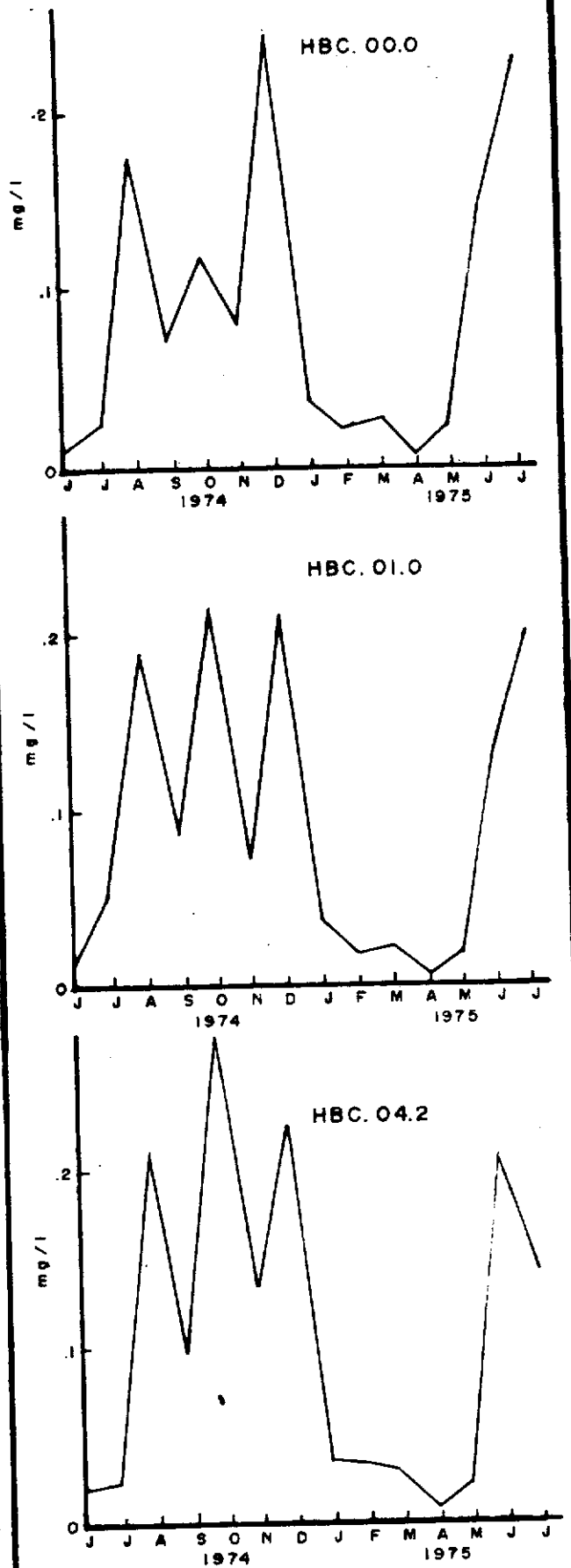

Figure 32 ORTHO-PHOSPHORUS CONCENTRATIONS IN THE HILLSBORO CANAL

total and ortho-phosphorus concentrations did vary significantly from month to month but not from station to station. Using the same technique, the statistical significance of the apparent seasonal difference in phosphorus concentrations was tested. The results (Appendix C) indicate that total and ortho-phosphorus concentrations were significantly higher in the wet season than in the dry season.

Nitrogen. Total nitrogen concentrations at the 3 stations on the Hillsboro Canal (Fig. 33) exhibited a great deal of variation over the months of the study. As with phosphorus, total nitrogen concentrations were also significantly higher in the wet season (1.82 mg/l) than in the dry season (1.38 mg/l) as is shown in Appendix C. The highest total nitrogen concentration (3.17 mg/l) was in July 1974 at Station HBC-00.0, while the lowest (0.74 m/gl) was at Station HBC-01.0 in November.

Dissolved inorganic nitrogen concentrations (Fig. 34) did not vary from station to station or month to month to the same extent as total nitrogen concentrations did. The range of dissolved inorganic nitrogen concentrations was from 0.03 mg/l in April at Station HBC-00.0 to 0.70 mg/l at Station HBC-04.2 in December. Concentrations of NO_x were used to test for the significance of differences in seasonal concentrations of inorganic nitrogen; but the results indicate that there was no difference between the seasonal values.

North New River

Temperature and Dissolved Oxygen. Temperatures never varied more than 2° C from the surface to the bottom for any month during the study. The average monthly temperatures (Fig. 35) show a range of variation of only 7.2^{o} C from the high of 27.6^{o} C in July 1974 to the low of 20.4^{o} C in December.

Dissolved oxygen concentrations (Fig. 36) on the North New River differed only slightly with depth, except in March when dissolved oxygen concentrations were somewhat higher at the surface than at the lower depths. Averaged over the entire study period the dissolved oxygen concentration was 4.13 mg/l at the

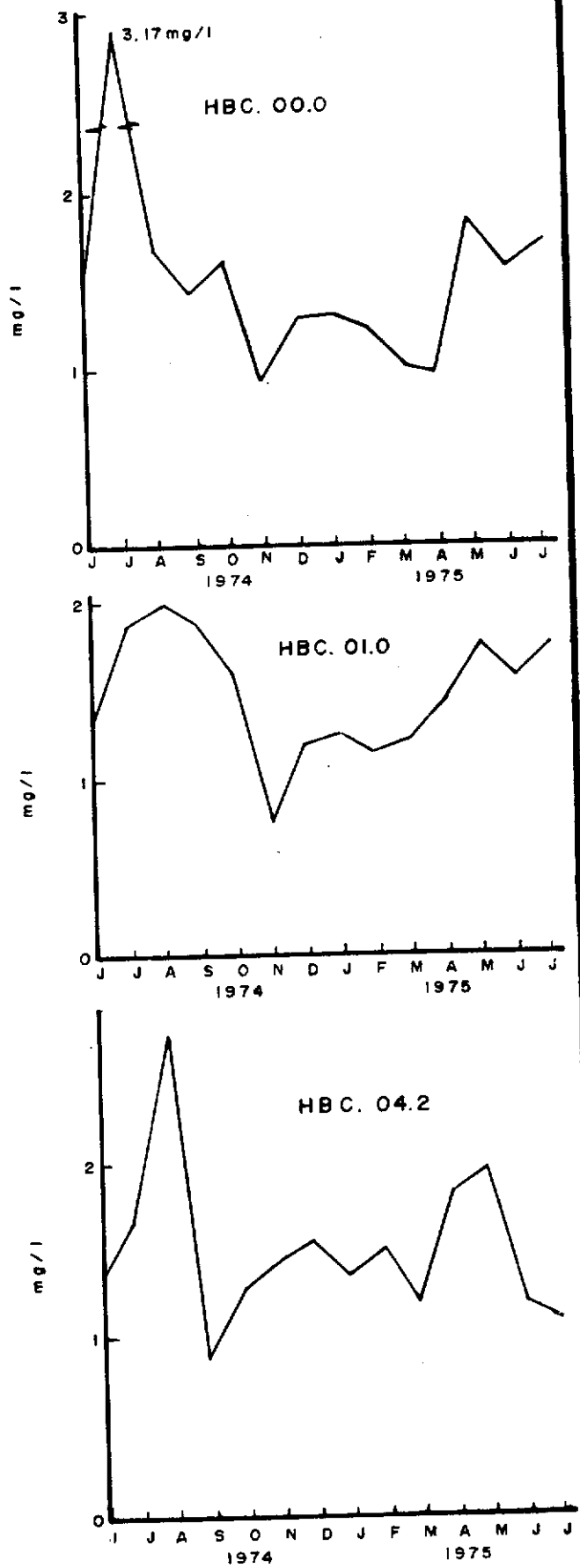

Figure 33 TOTAL NITROGEN CONCENTRATIONS IN THE HILLSBORO CANAL

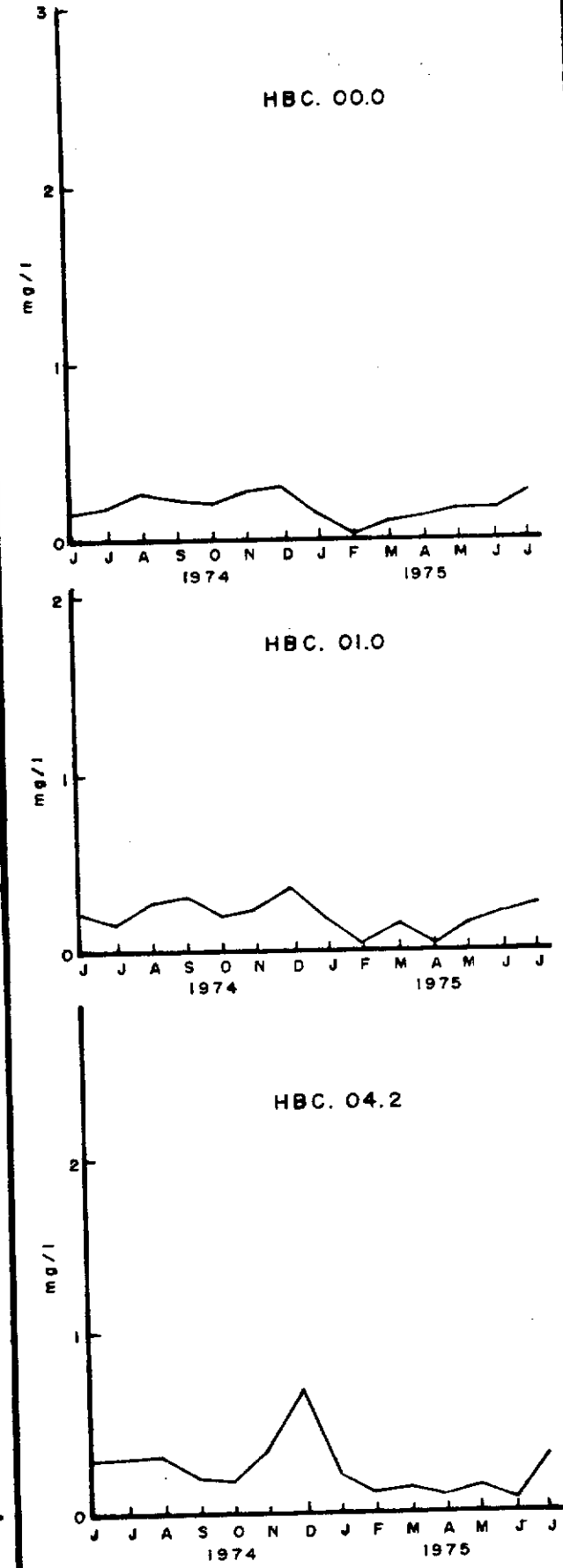

Figure 34 DISSOLVED INORGANIC NITROGEN CONCENTRATIONS IN THE HILLSBORO CANAL

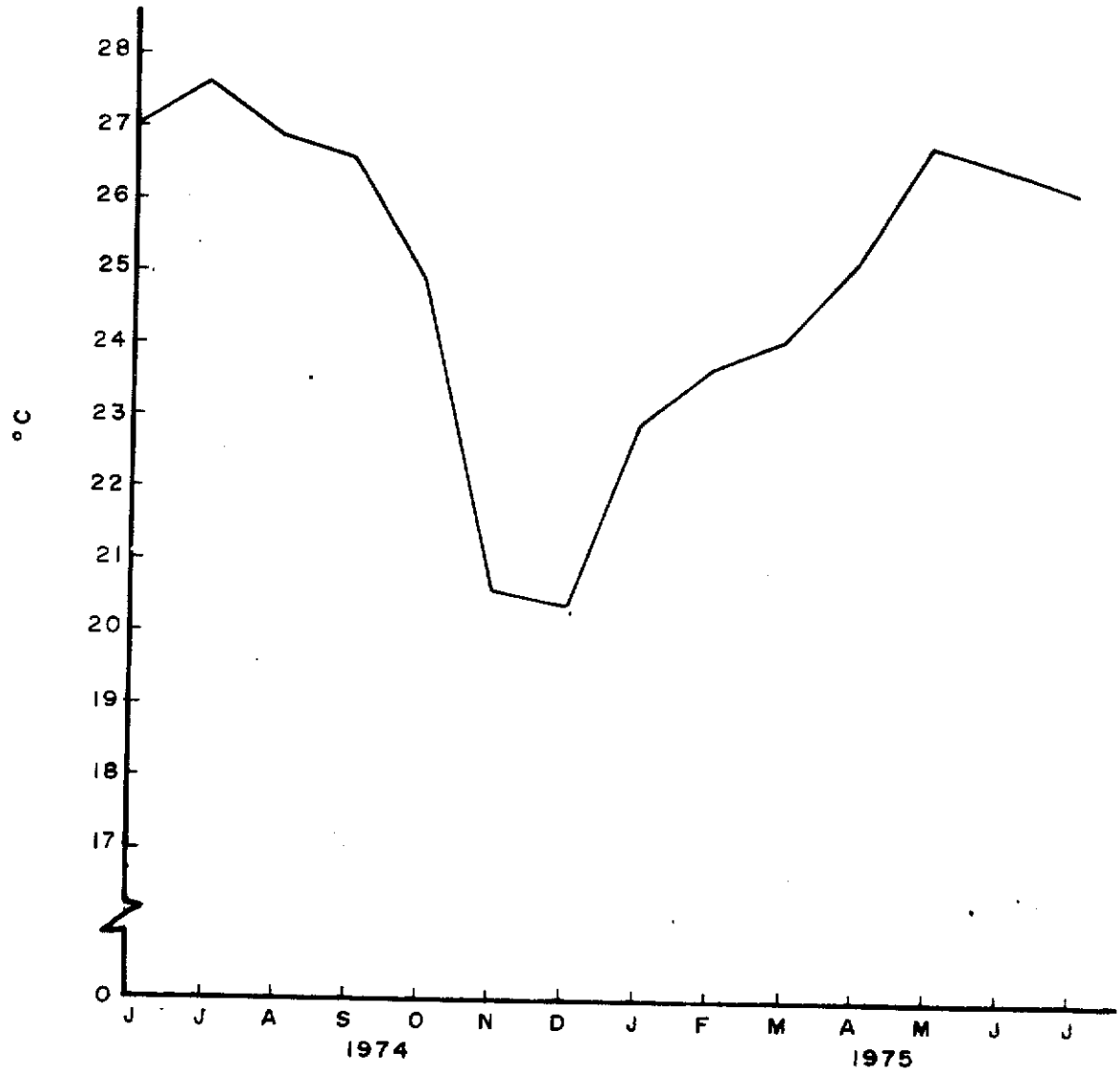

Figure 35 TEMPERATURES IN THE NORTH NEW RIVER CANAL

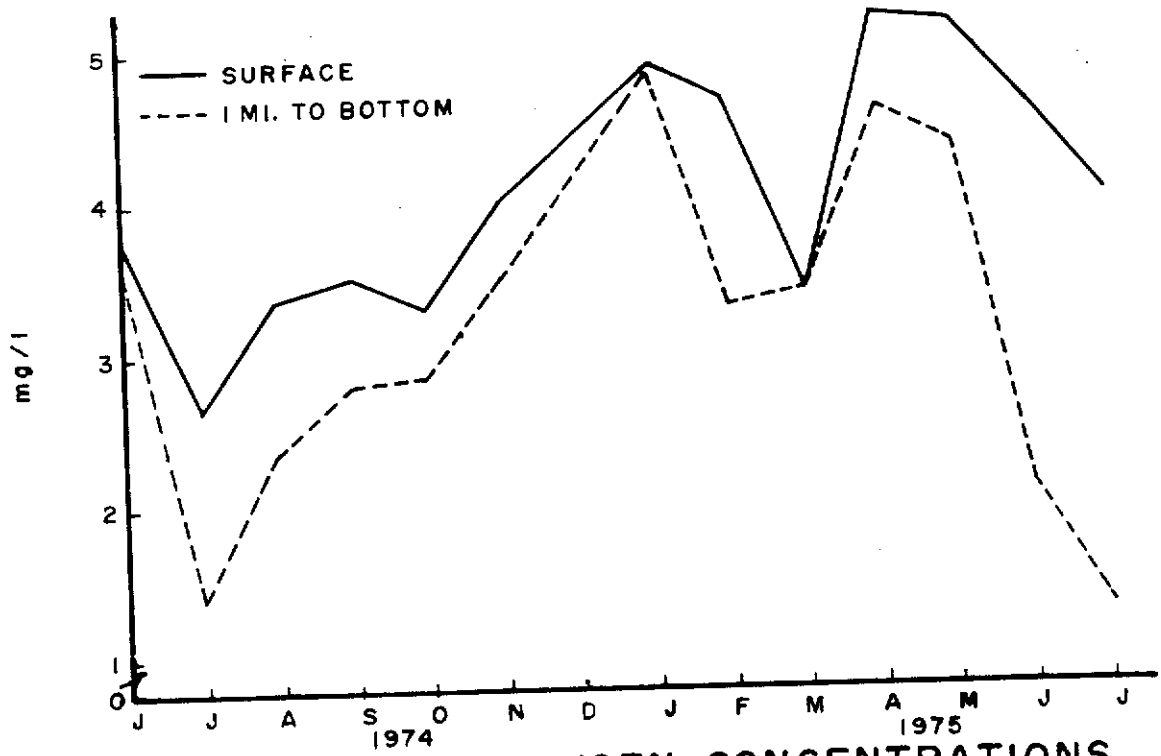

Figure 36 DISSOLVED OXYGEN CONCENTRATIONS AT THE SURFACE AND LOWER DEPTHS IN THE NORTH NEW RIVER CANAL

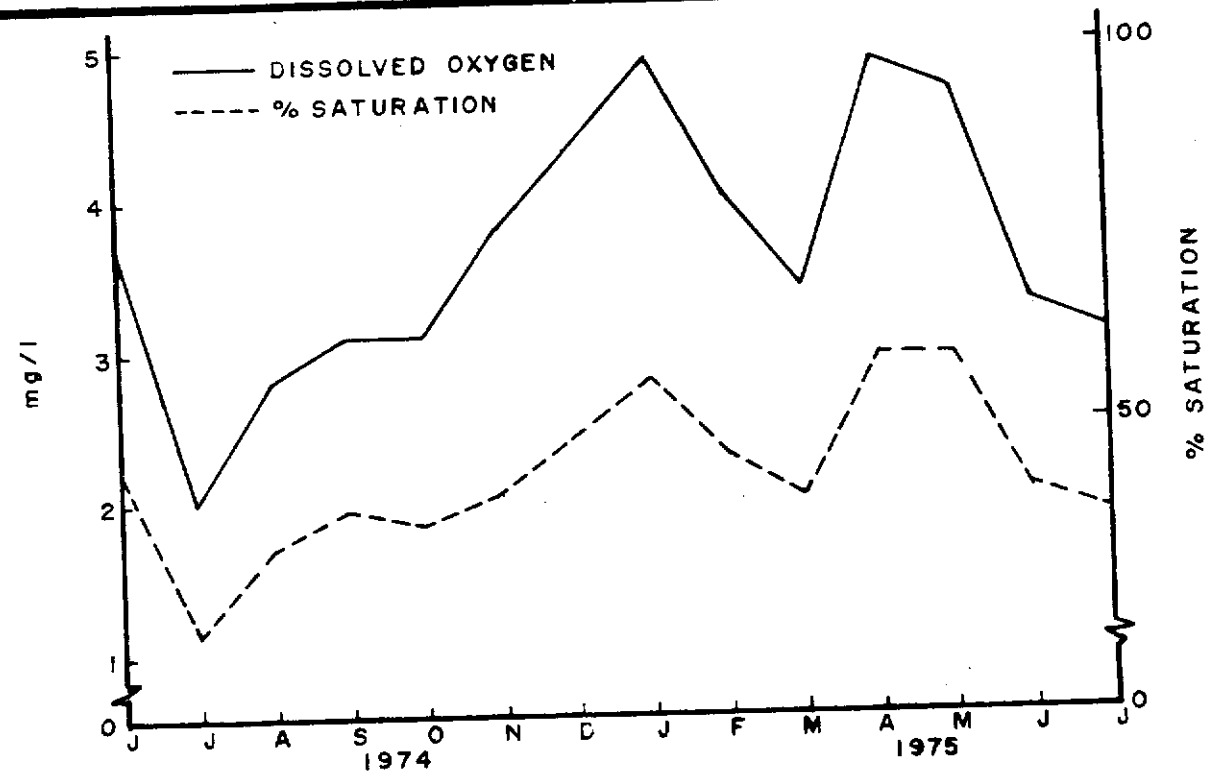

Figure 37 DISSOLVED OXYGEN CONCENTRATIONS AND PERCENT SATURATION FOR ALL DEPTHS ON THE NORTH NEW RIVER CANAL

surface and 3.26 mg/l from 1 meter to the bottom.

Dissolved oxygen concentrations, averaged over all depths and stations (Fig. 37), were equal to or higher than 4.0 mg/l only in January, February, April and May. The highest concentration of dissolved oxygen during the study (4.9 mg/l) occurred in both January and April, while the lowest concentration (2.0 mg/l) was in July 1974. Percent saturation values (Fig. 37), as could be expected, show a high degree of correlation with dissolved oxygen levels.

pH. The pH on the North New River (Fig. 38) varied from a low of 6.93 units in August to a high of 8.36 units in July 1975. Dry season pH values appear to fluctuate somewhat less than those in the wet season, ranging from a high (7.57 units) in December to a low (7.20 units) in March.

Alkalinity. The alkalinities (Fig. 39) on the North New River are very high. During the entire study alkalinities were consistently above 4.0 meq/l (200 mg/l $CaCO_3$), ranging from a canal average of 6.12 meq/l (306 mg/l $CaCO_3$) in January, to a low of 4.43 meq/l (221.5 mg/l $CaCO_3$) in June 1974. A slight seasonal trend of increasing alkalinities during the dry season can be seen; however, the significance of this trend could not be tested statistically.

Conductivity. A slight seasonal trend in conductivities (Fig. 40) was evident especially toward the end of the 1974-75 dry season when the values increased. The lowest conductivity (518 μmhos/cm) occurred in August and the highest (1573 μmhos/cm) in July 1975. Conductivities at the surface tended to be slightly lower than at lower depths, 818 μmhos/cm compared with 820 μmhos/cm, but the differences are not statistically significant.

Major Constituents. The major cations (sodium, potassium, calcium and magnesium) with the exception of calcium all showed a definite seasonal trend (Figs. 41 through 44). Concentrations of these cations as well as the chloride anion (Fig. 45) increased from the beginning to the end of the dry season.

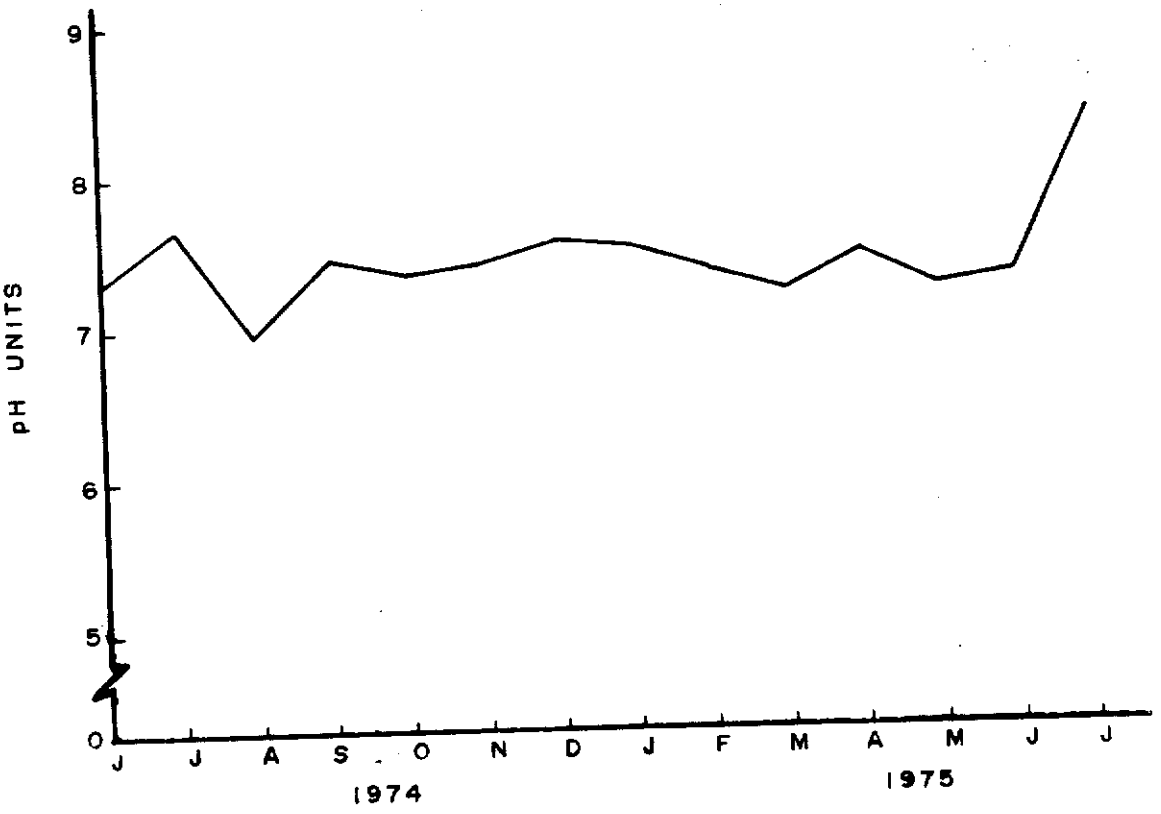

Figure 38 pH IN THE NORTH NEW RIVER CANAL.

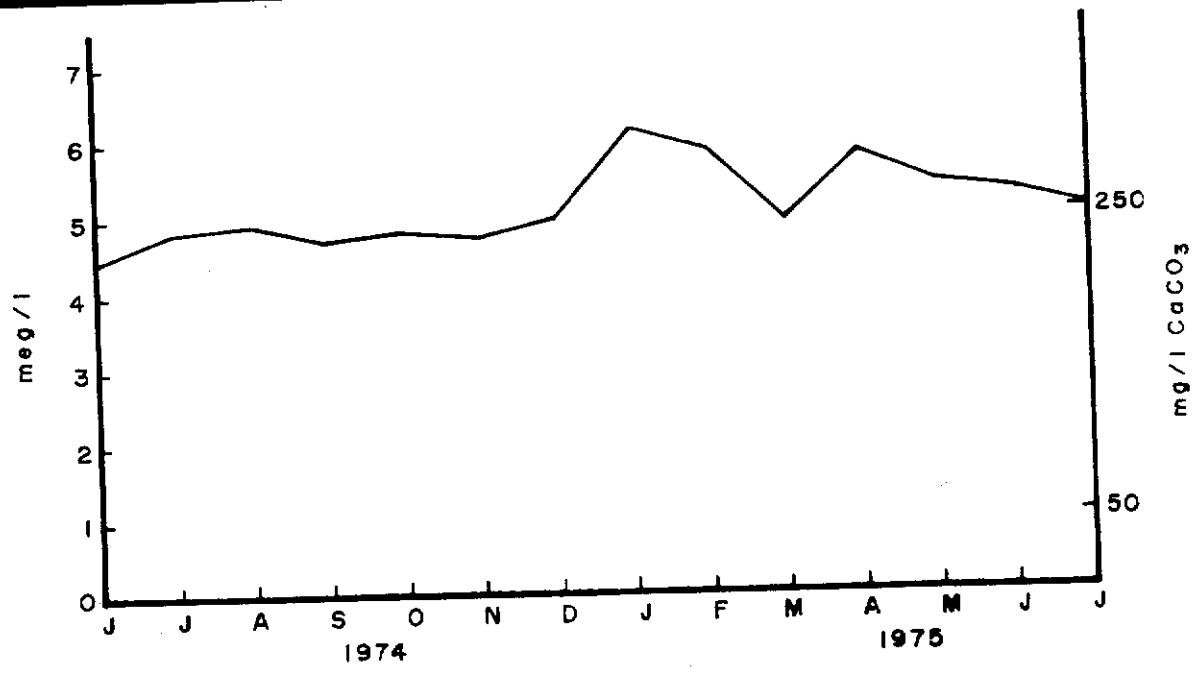

Figure 39 ALKALINITIES IN THE NORTH NEW RIVER CANAL

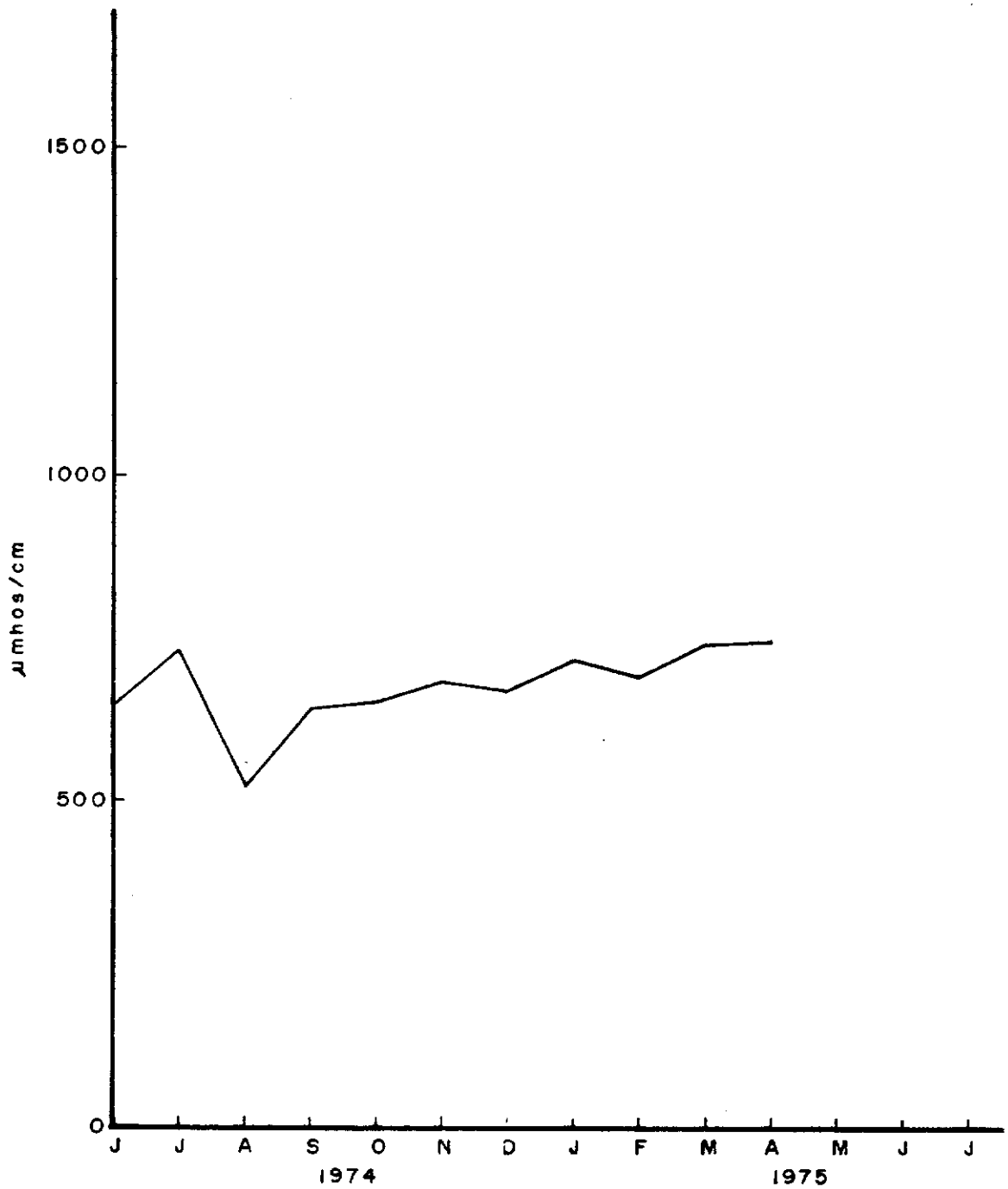

Figure 40 CONDUCTIVITIES IN THE NORTH NEW RIVER CANAL

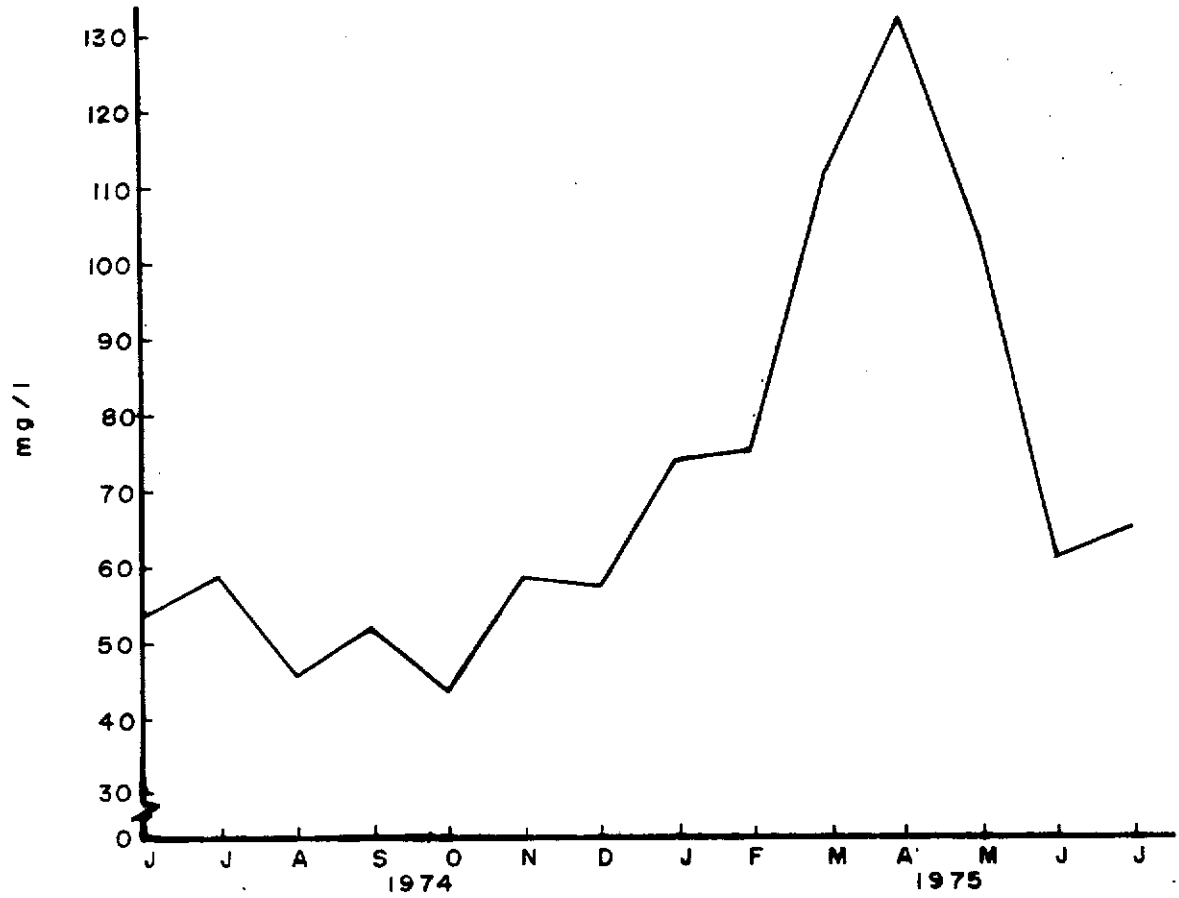

Figure 41 SODIUM CONCENTRATIONS IN THE NORTH NEW RIVER CANAL

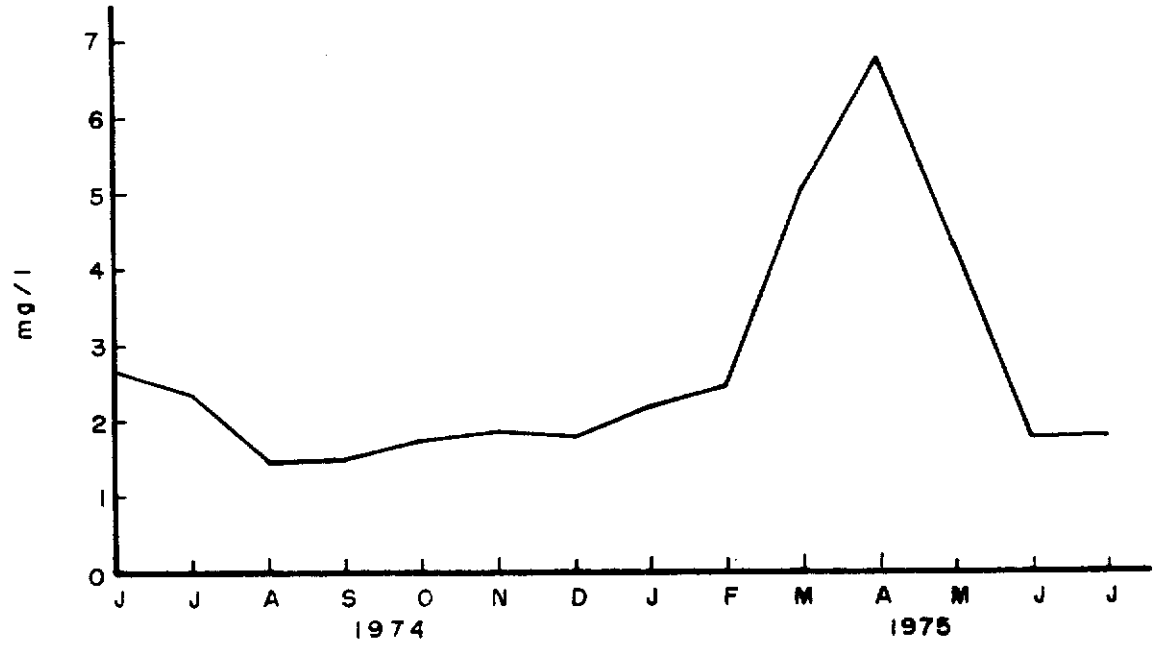

Figure 42 POTASSIUM CONCENTRATIONS IN THE NORTH NEW RIVER CANAL

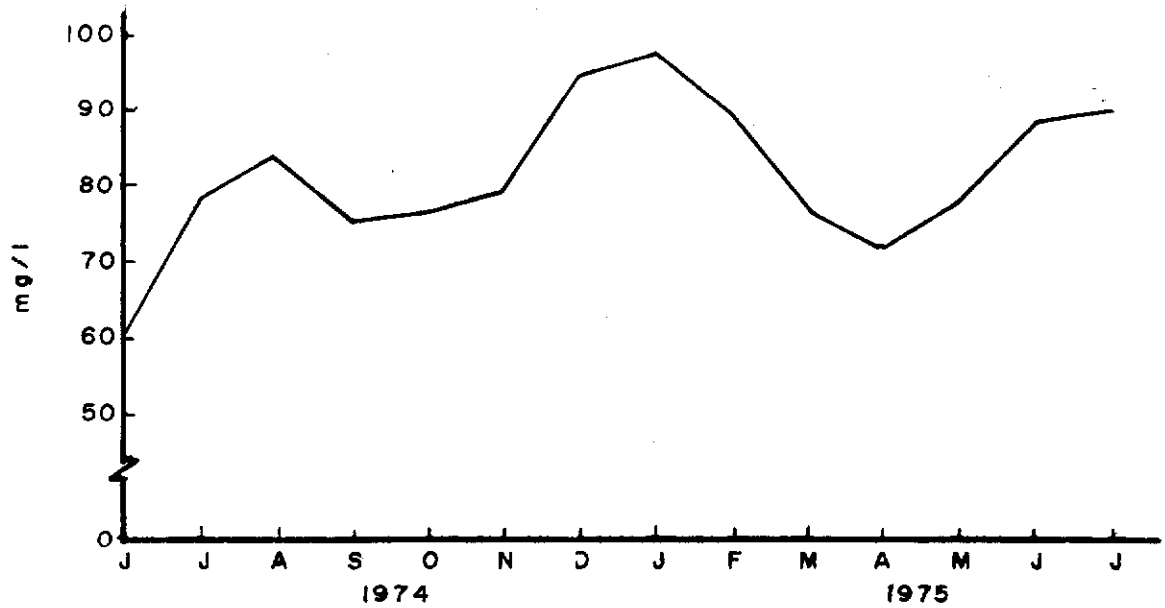

Figure 43 CALCIUM CONCENTRATIONS IN THE NORTH NEW RIVER CANAL

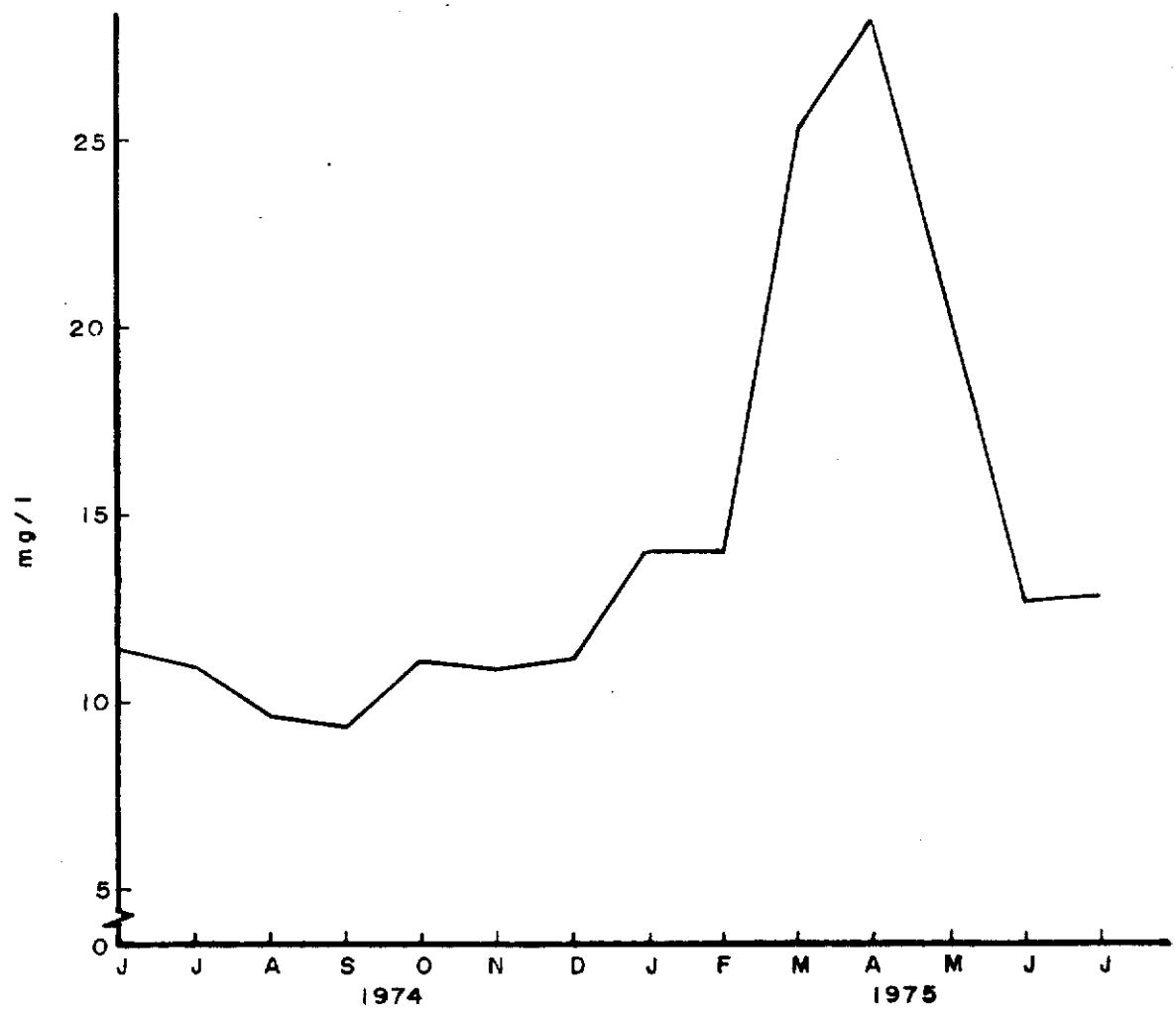

Figure 44 MAGNESIUM CONCENTRATIONS IN THE NORTH NEW RIVER CANAL

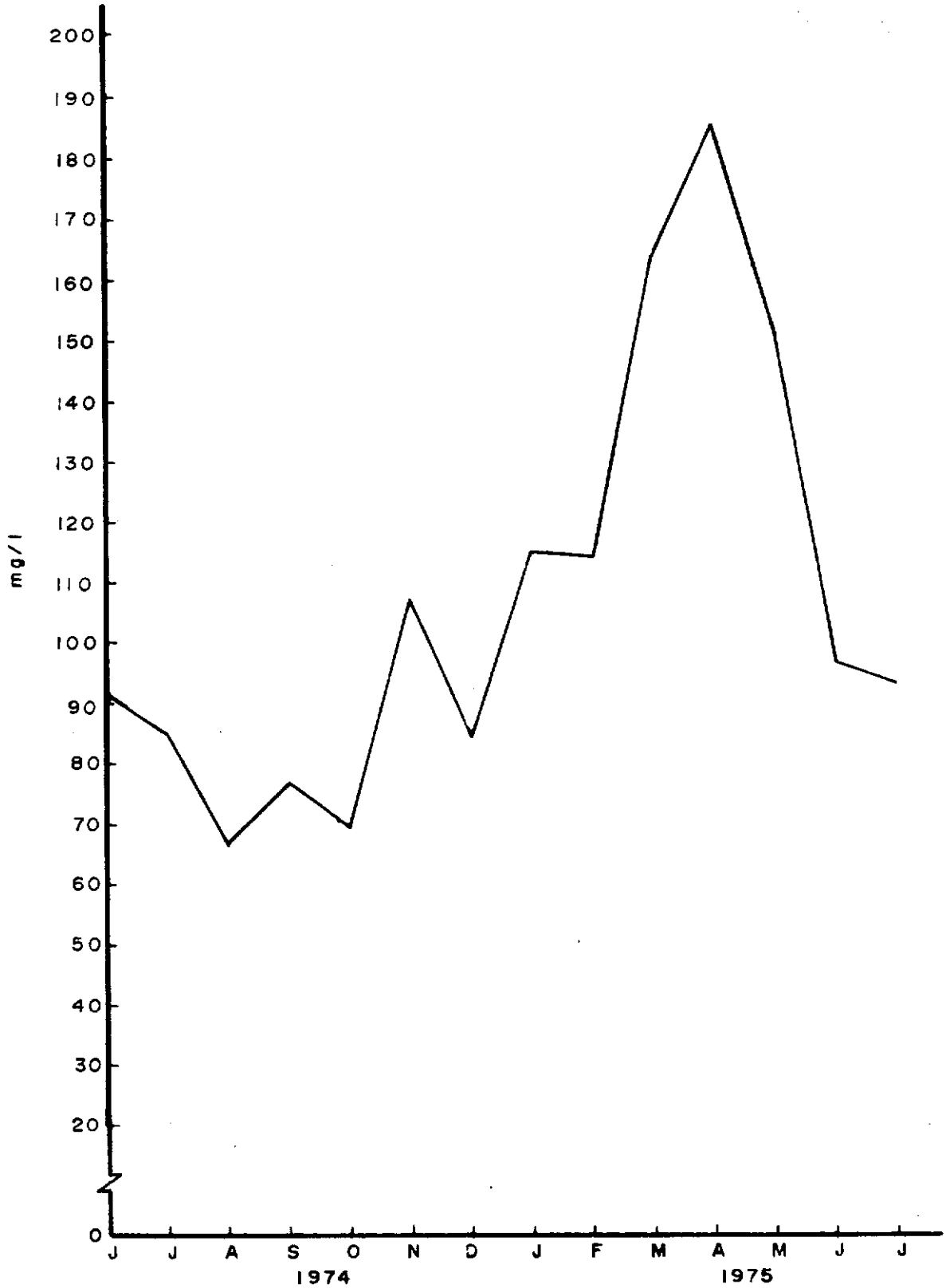

Figure 45 CHLORIDE CONCENTRATIONS IN THE NORTH NEW RIVER CANAL

Calcium concentrations (Fig. 43) range from a high of 97.2 mg/l in January to a low of 60.2 mg/l in July 1974. While seasonal trends were not as definite with calcium, there was a slight trend towards increasing concentrations from the end of the wet season until January.

A two-way analysis of variance was performed to test for the significance of the variation in chloride concentrations between both stations and months. The results of this analysis (Appendix C) indicated that there is a significant variation of chloride concentrations between months. Using Duncan's multiple range test to separate the months with significantly different chloride concentrations (Table 6) shows, statistically, the late dry season maximums in chloride concentrations.

Phosphorus. The levels of both total and ortho-phosphorus in the North New River were very low (Figs. 46 and 47) throughout the entire study. Total phosphorus concentrations ranged from below the detection limit (0.002 mg/l) in December to a high of 0.043 mg/l in March at Station NNR-09.0. Concentrations of ortho-phosphorus ranged from below the detection limit (0.002 mg/l) to 0.013 mg/l at Station NNR-00.0 in November. The extremely low levels of phosphorus during the study period make it very difficult to detect much variation. Appendix C gives the results of two ANOVA's, one for total phosphorus and one for ortho-phosphorus, which show that no statistically significant variation occurred between either the months of the study or the stations on the canal.

Nitrogen. Concentrations of total nitrogen (Fig. 48) on the other hand fluctuated to a fairly great extent from one month to the next, especially during the wet season. Station to station variability, in contrast, was rather small except in July 1974 and 1975 and in August. Station NNR-05.8 had the highest total nitrogen concentration (2.95 mg/l) of the entire study period, in August. The lowest total nitrogen concentration occurred in July 1974 at Station NNR-09.0.

TABLE 6. RESULTS OF DUNCAN'S MULTIPLE RANGE TEST FOR DIFFERENCES IN CHLORIDE CONCENTRATIONS BY MONTH ON THE NORTH NEW RIVER.

68.9	69.3	76.6	84.3	84.7	91.1	93.1	96.6	106.8	114.1	114.8	151.0	163.8	184.9
August	October	September	December	June 74	July 74	July 75	June 75	November	February	January	May	March	April

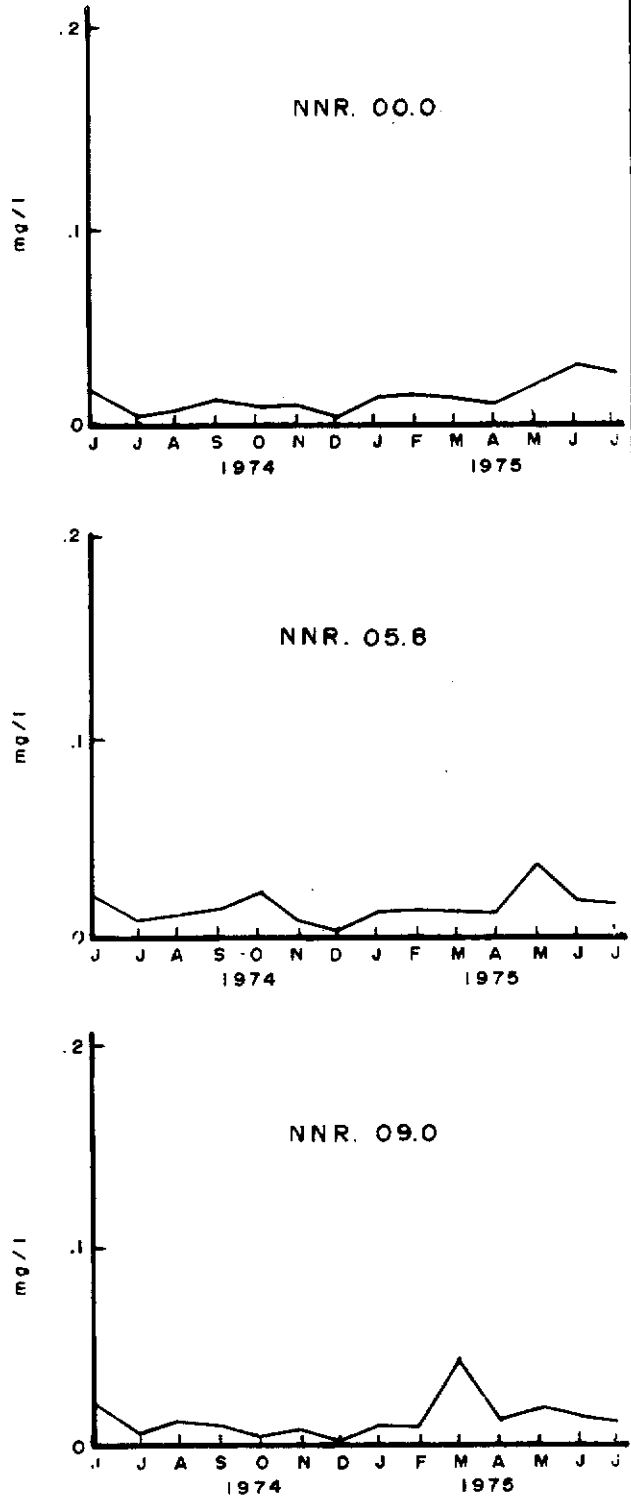

Figure 46 TOTAL PHOSPHORUS CONCENTRATIONS IN THE NORTH NEW RIVER CANAL

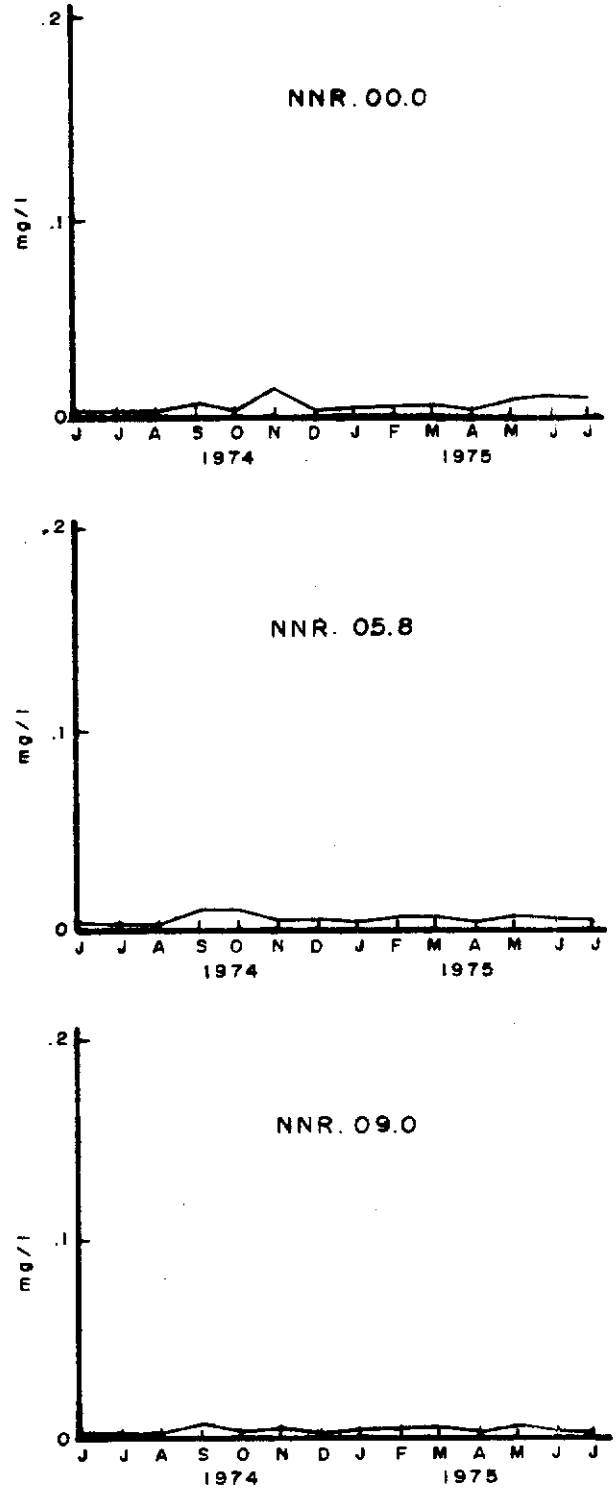

Figure 47 ORTHO-PHOSPHORUS CONCENTRATIONS IN THE NORTH NEW RIVER CANAL

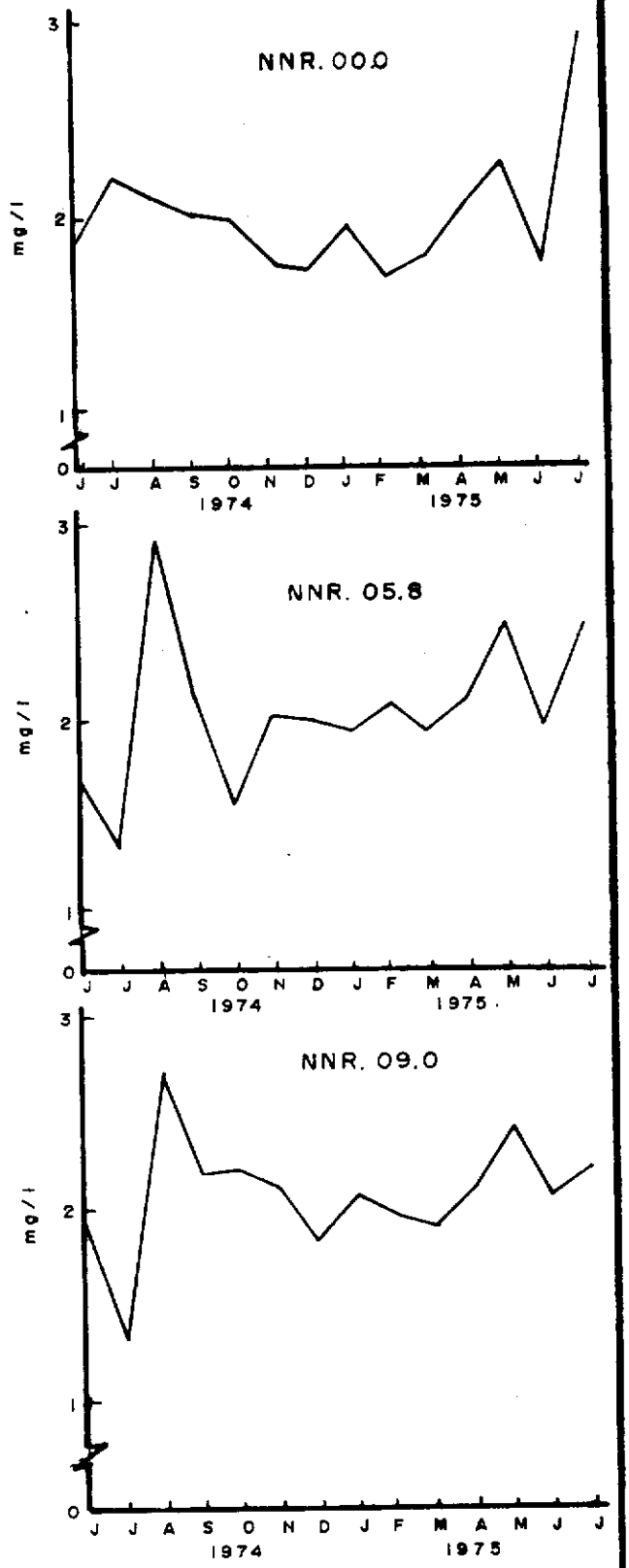

Figure 48 TOTAL NITROGEN CONCENTRATIONS IN THE NORTH NEW RIVER CANAL

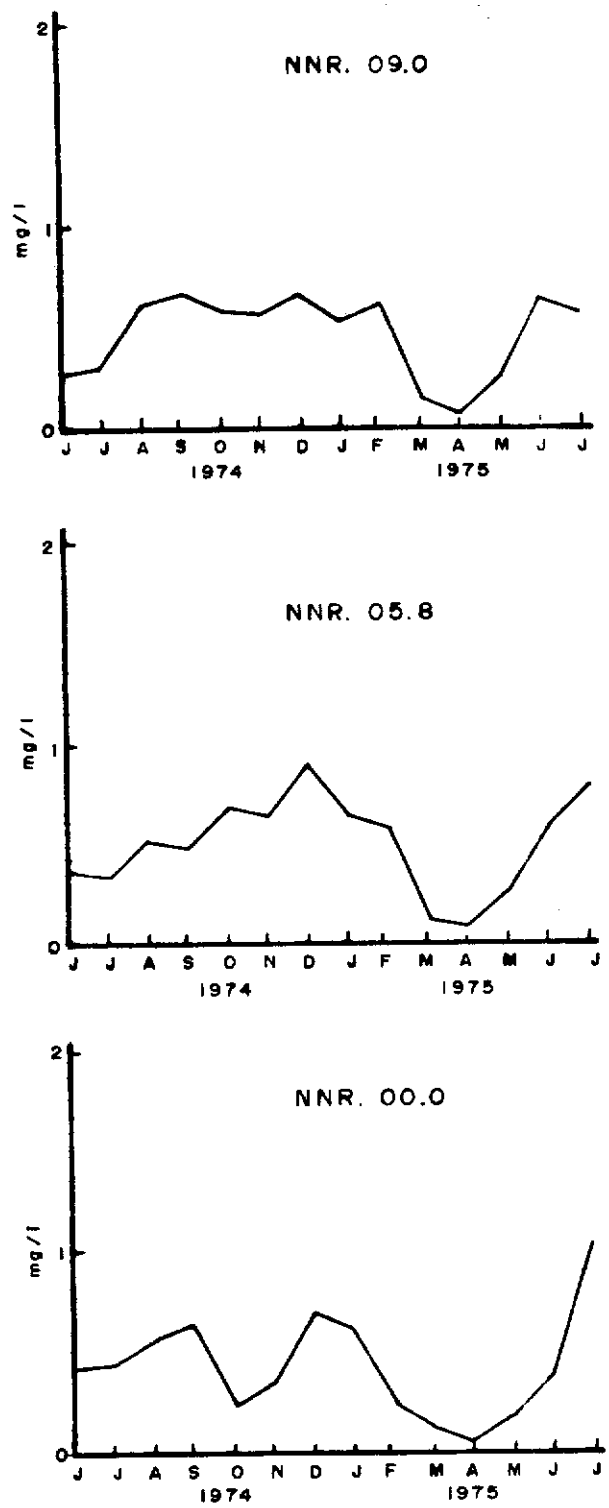

Figure 49 DISSOLVED INORGANIC NITROGEN CONCENTRATIONS IN. THE NORTH NEW RIVER CANAL

Dissolved inorganic nitrogen concentrations (Fig. 49) did not follow any easily recognizable pattern, although dry season levels did tend to be higher than early wet season concentrations. The highest level of dissolved inorganic nitrogen (1.04 mg/l) was in July 1975 at Station NNR-00.0. At the same station in April the lowest dissolved inorganic nitrogen concentration (0.04 mg/l) occurred. Results of an analysis of variance for NO_x variation between stations and between months did not yield any conclusive results because of the presence of a significant station-month interaction.

Tamiami Canal and Snapper Creek

Temperature and Dissolved Oxygen. Temperatures on the Tamiami Canal (Fig. 50) ranged from a low of 21.3^{o} C in December to a high in June 1975 of 27.1^{o} C, a total variation of only 5.8^{o} C. Snapper Creek (Fig. 50) had a temperature range of only 5.0^{o} C from the low (21.5^{o} C) in November to the high 26.5^{o} C) in July 1974 and June 1975.

Dissolved oxygen concentrations (Fig. 51) on the Tamiami Canal varied with depth, especially during the wet season. The highest concentrations of dissolved oxygen at the surface (7.3 mg/l) occurred in April and the lowest concentration (1.05 mg/l) in December. At the lower depths (1 meter to the bottom) dissolved oxygen concentrations ranged from the low of (0.5 mg/l) in July 1974 to a high of (5.87 mg/l) in April.

pH. The pH's (Fig. 52) on the Tamiami Canal and Snapper Creek were nearly identical during the study period. Values for pH ranged from a low of 6.75 units in August to a high of 7.54 units in October on the Tamiami Canal, and a high of 7.53 units in October to a low of 6.80 units in March on Snapper Creek. There does appear to be some slight seasonal pattern for pH, dry season pH values tending to be somewhat lower than during the wet season.

Alkalinity. The Tamiami Canal tended to have slightly higher alkalinities (Fig. 53) during the wet season than Snapper Creek, with the reverse being the

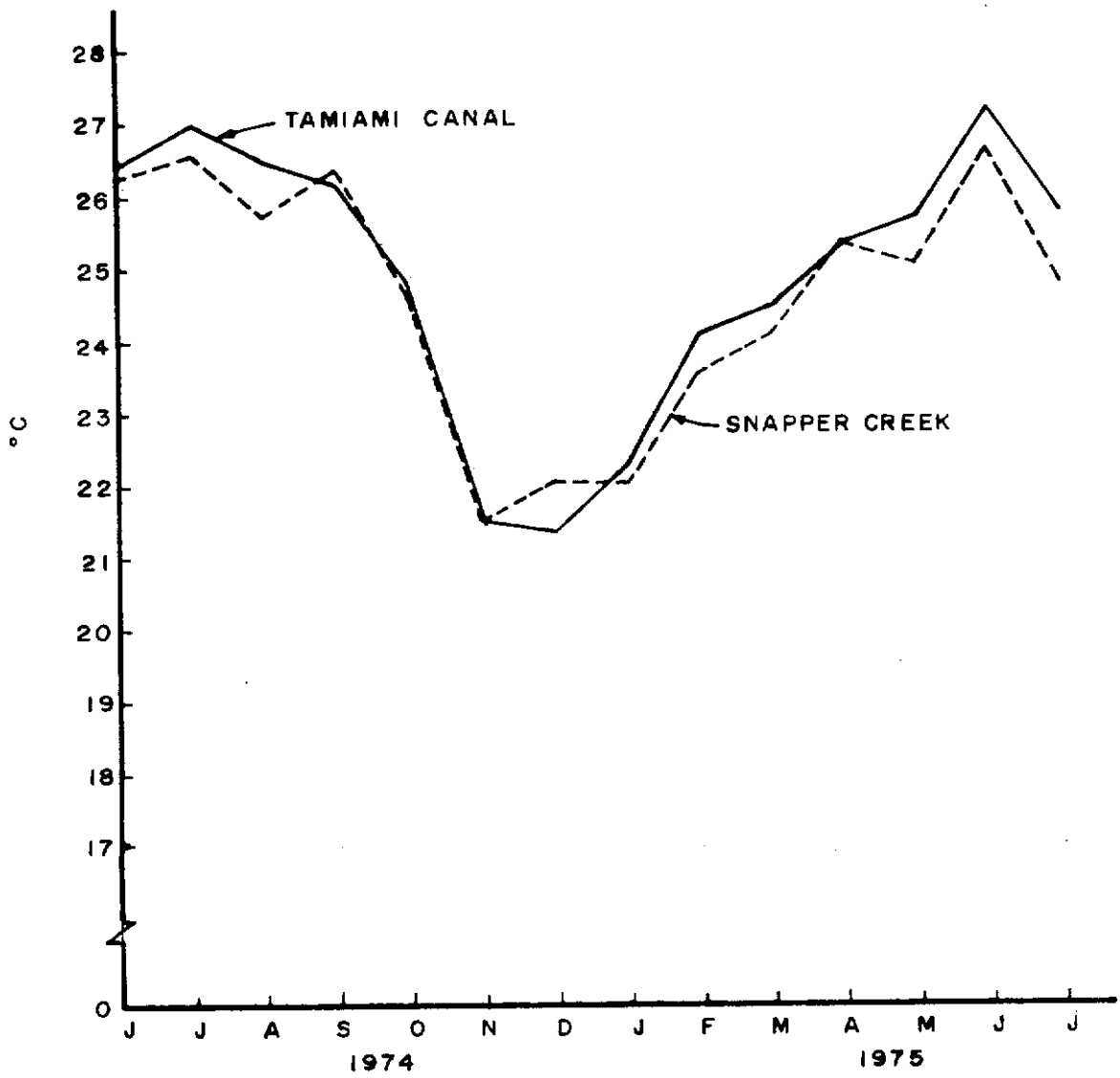

Figure 50 TEMPERATURES IN THE TAMIAMI CANAL AND SNAPPER CREEK

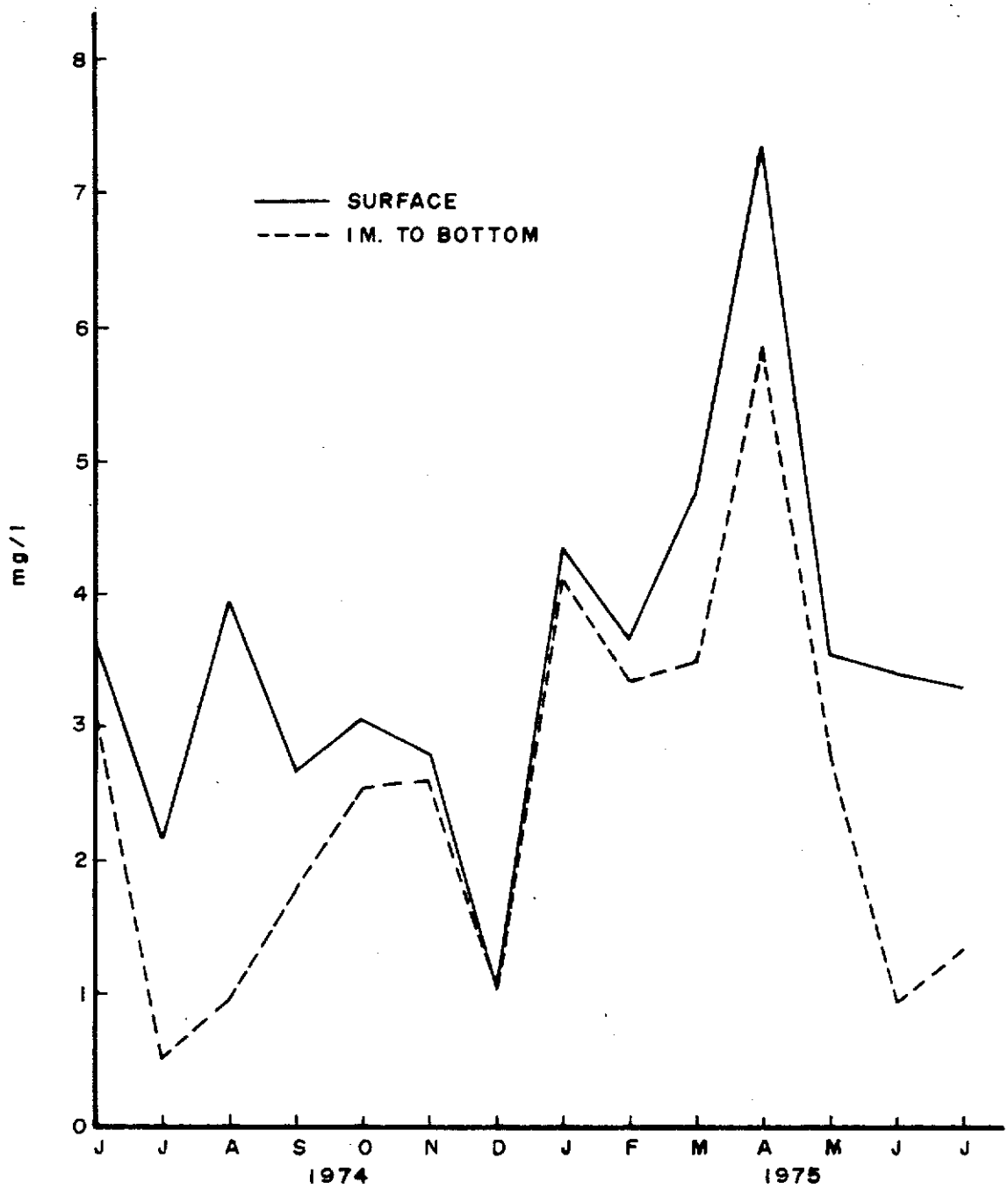

Figure 51 DISSOLVED OXYGEN CONCENTRATIONS AT THE SURFACE AND LOWER DEPTHS IN THE TAMIAMI CANAL

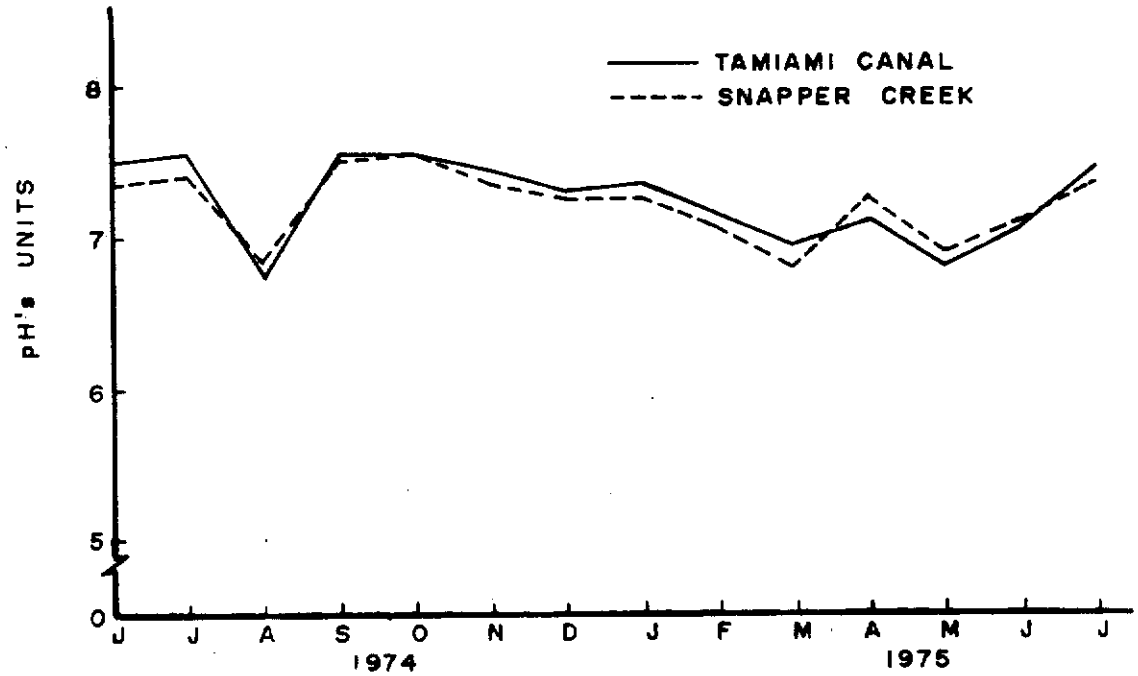

Figure 52 pH'S IN THE TAMIAMI CANAL AND SNAPPER CREEK

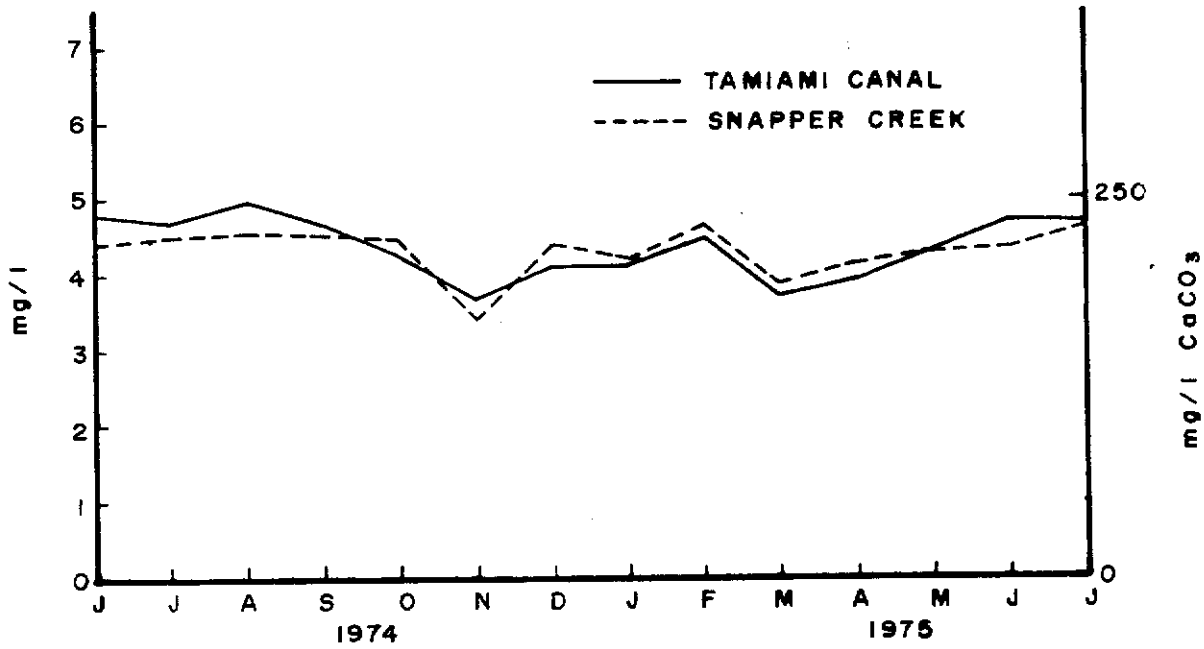

Figure 53 ALKALINITIES IN THE TAMIAMI CANAL AND SNAPPER CREEK

tendency in the dry season. When averages are calculated for the entire study, the results show the alkalinities to be essentially the same, 4.30 meq/l (215 mg/l $CaCO_3$) and 4.29 meq/l (214.5 mg/l $CaCO_3$) respectively. The highest (4.95 meq/l, 247.5 mg/l $CaCO_3$) and lowest (3.66 meq/l, 183 mg/l $CaCO_3$) alkalinities on the Tamiami Canal occurred in August and November respectively. Snapper Creek had the highest alkalinity (4.67 meq/l, 233.5 mg/l $CaCO_3$) in July 1975 and the lowest (3.41 meq/l, 170.5 mg/l $CaCO_3$) in November.

Conductivity. The Tamiami Canal and Snapper Creek both followed very similar trends with respect to conductivity (Fig. 54). A slight increasing trend in conductivity levels is apparent through the dry season. The highest conductivities on both canals occurred in July 1975, 1445 μmhos/cm for the Tamiami Canal and 1360 μmhos/cm for Snapper Creek. During April conductivities were at their lowest levels, 555 μmhos/cm for the Tamiami Canal and 463 μmhos/cm for Snapper Creek. Conductivities tended to be slightly less at the surface than at lower depths, 581 μmhos/cm compared with 598 μmhos/cm for the Tamiami Canal and 533 μmhos/cm compared with 570 μmhos/cm for Snapper Creek.

Major Constituents. Concentrations of the major cations, sodium, potassium, calcium and magnesium (Figs. 55 through 58) did not follow any distinct seasonal pattern, as was the case for the Hillsboro and the North New River Canals. Sodium concentrations (Fig. 55) on the Tamiami Canal varied from a low of 23.1 mg/l in July 1974 to a high of 42.0 mg/l in April. Concentrations of potassium (Fig. 56) varied only slightly, ranging from a high of 1.62 mg/l in July 1974 to a low of 0.95 mg/l in August. Calcium (Fig. 57) ranged from a high of 87.9 mg/l in June 1975 to a low of 64.4 mg/l in June 1974. Magnesium concentrations (Fig. 58) were fairly low from November through March varying only 0.9 mg/l from the lowest to highest value. The lowest concentration of magnesium (4.90 mg/l) occurred in November and the highest (8.63 mg/l) was in May.

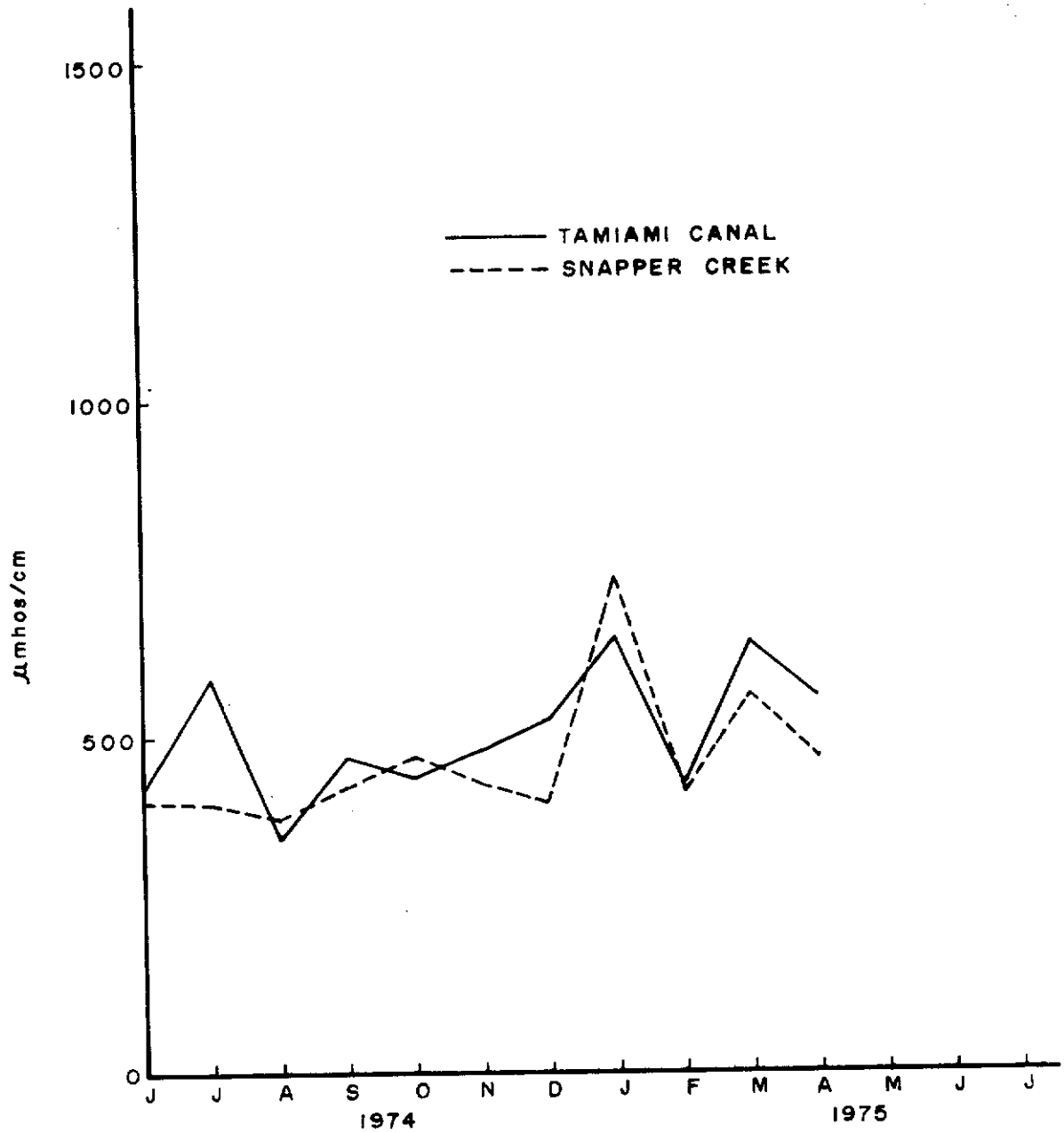

Figure 54 CONDUCTIVITIES IN THE TAMIAMI CANAL AND SNAPPER CREEK

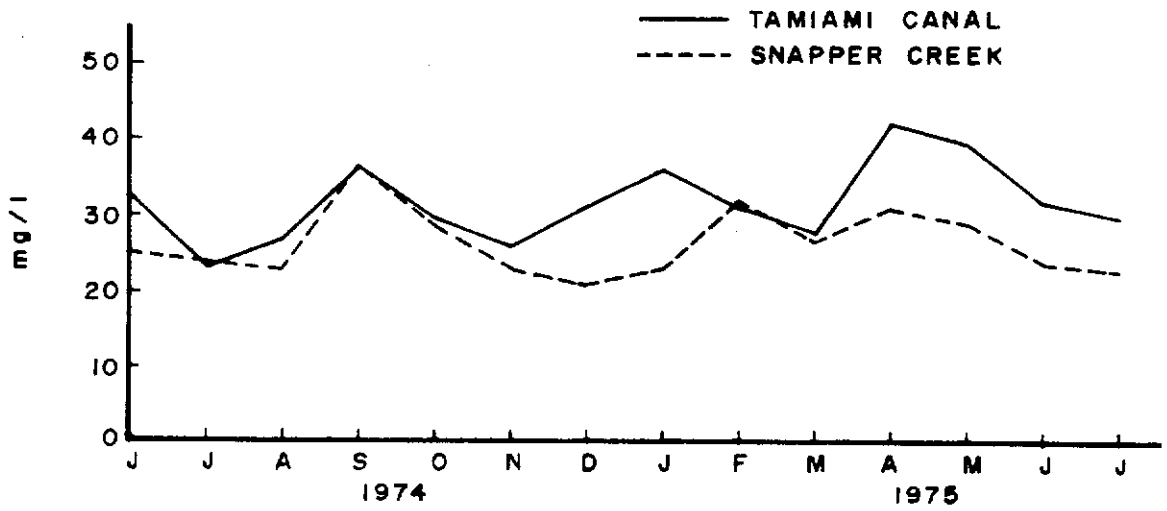

Figure 55 SODIUM CONCENTRATIONS IN THE TAMIAMI CANAL AND SNAPPER CREEK

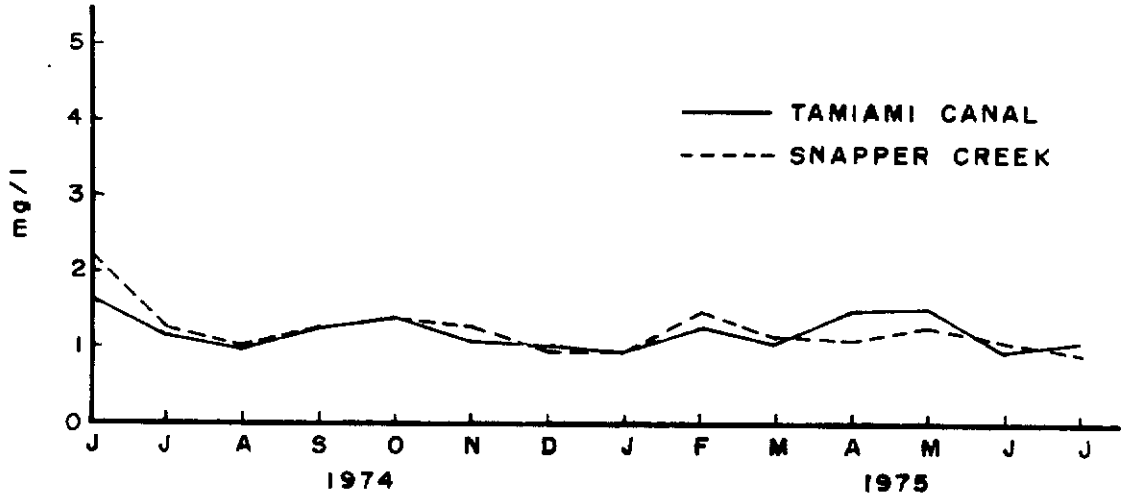

Figure 56 POTASSIUM CONCENTRATIONS IN THE TAMIAMI CANAL AND SNAPPER CREEK

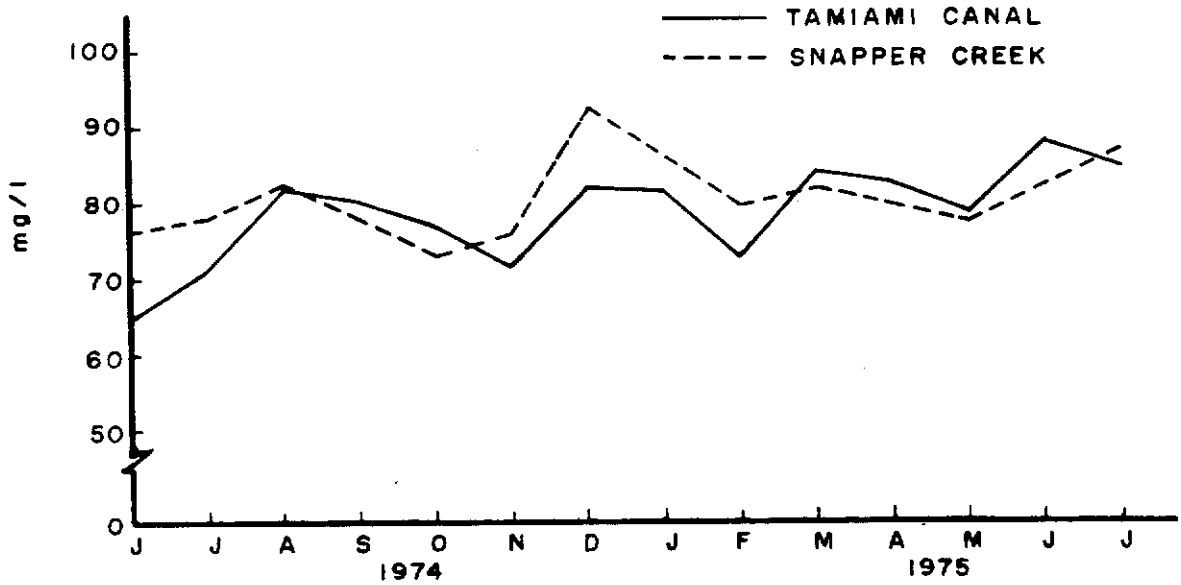

Figure 57 CALCIUM CONCENTRATIONS IN THE TAMIAMI CANAL AND SNAPPER CREEK

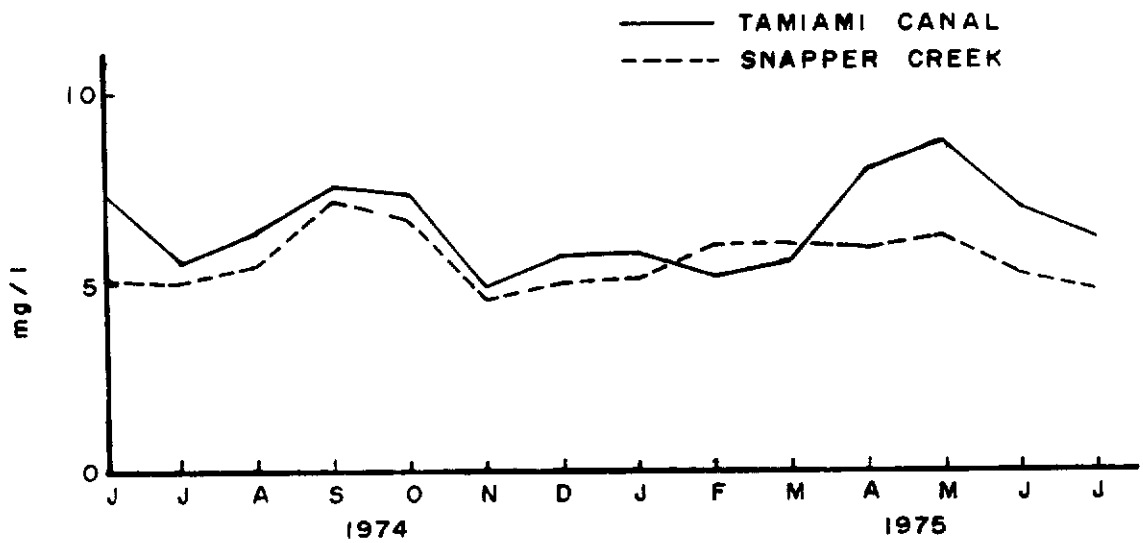

Figure 58 MAGNESIUM CONCENTRATIONS IN THE TAMIAMI CANAL AND SNAPPER CREEK

Concentrations of the chloride anion (Fig. 59) were also highly variable. The highest chloride concentration (68.4 mg/l) was in April and the lowest (33.9 mg/l) in August. No clear seasonal trend was evident for chlorides on the Tamiami Canal.

The results of a two-way analysis of variance (Appendix C) of chloride concentrations by stations and months indicates that there is a significant variation at the 90% confidence level between months and stations. When stations are grouped using Duncan's multiple range test the results (Table 7) show that Station TAM-16.0 had significantly higher chloride concentrations than both the Snapper Creek Station and Station TAM-10.8.

Phosphorus. Concentrations of total and ortho-phosphorus (Figs. 60 and 61) of the Tamiami Canal were generally very low. With the exception of the high concentrations (.227 and .176 mg/l) at Station TAM-10.8 in February and March, total phosphorus concentrations ranged from a high of 0.042 mg/l in January at Station TAM-16.0 to undetectable levels (<0.002 mg/l) at Stations TAM-06.5 and TAM-16.0 in December. Ortho-phosphorus concentrations (Fig. 61) followed those of total phosphorus very closely. Concentrations of ortho-phosphorus exceeded total phosphorus concentrations in both October and November at Station TAM-16.0 making their accuracy doubtful. The highest ortho-phosphorus concentration (0.197 mg/l) in February at Station TAM-10.8, coincided with the highest total phosphorus concentration (0.227 mg/l). As evident from Figure 61, ortho-phosphorus concentrations were often at or below the detection limit (0.002 mg/l).

Concentrations of both ortho and total phosphorus (Figs. 60 and 61) were higher during most of the study on Snapper Creek, Station TSC-S3.5 The highest concentrations of total and ortho-phosphorus on Snapper Creek, 0.266 mg/l and 0.189 mg/l respectively, were in June 1974. The lowest total (0.007 mg/l) and ortho-phosphorus (0.004 mg/l) concentrations on Snapper Creek occurred in February

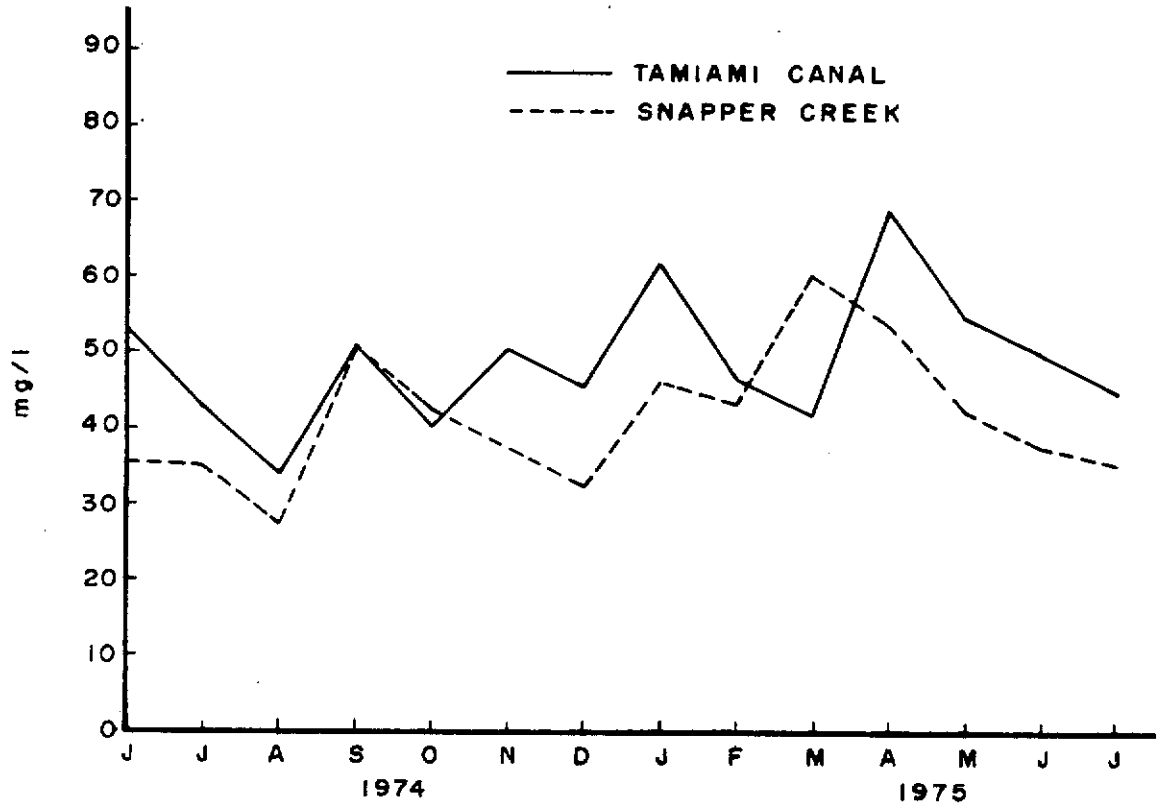

Figure 59 CHLORIDE CONCENTRATIONS IN THE TAMIAMI CANAL AND SNAPPER CREEK

TABLE 7. RESULTS OF DUNCAN'S MULTIPLE RANGE TEST FOR DIFFERENCES IN CHLORIDE CONCENTRATIONS ON SNAPPER CREEK AND THE TAMIAMI CANAL

(41.7)	(43.6)	(49.5)	(54.8)
TSC-53.5	TAM-10.8	TAM-06.5	TAM-16.0

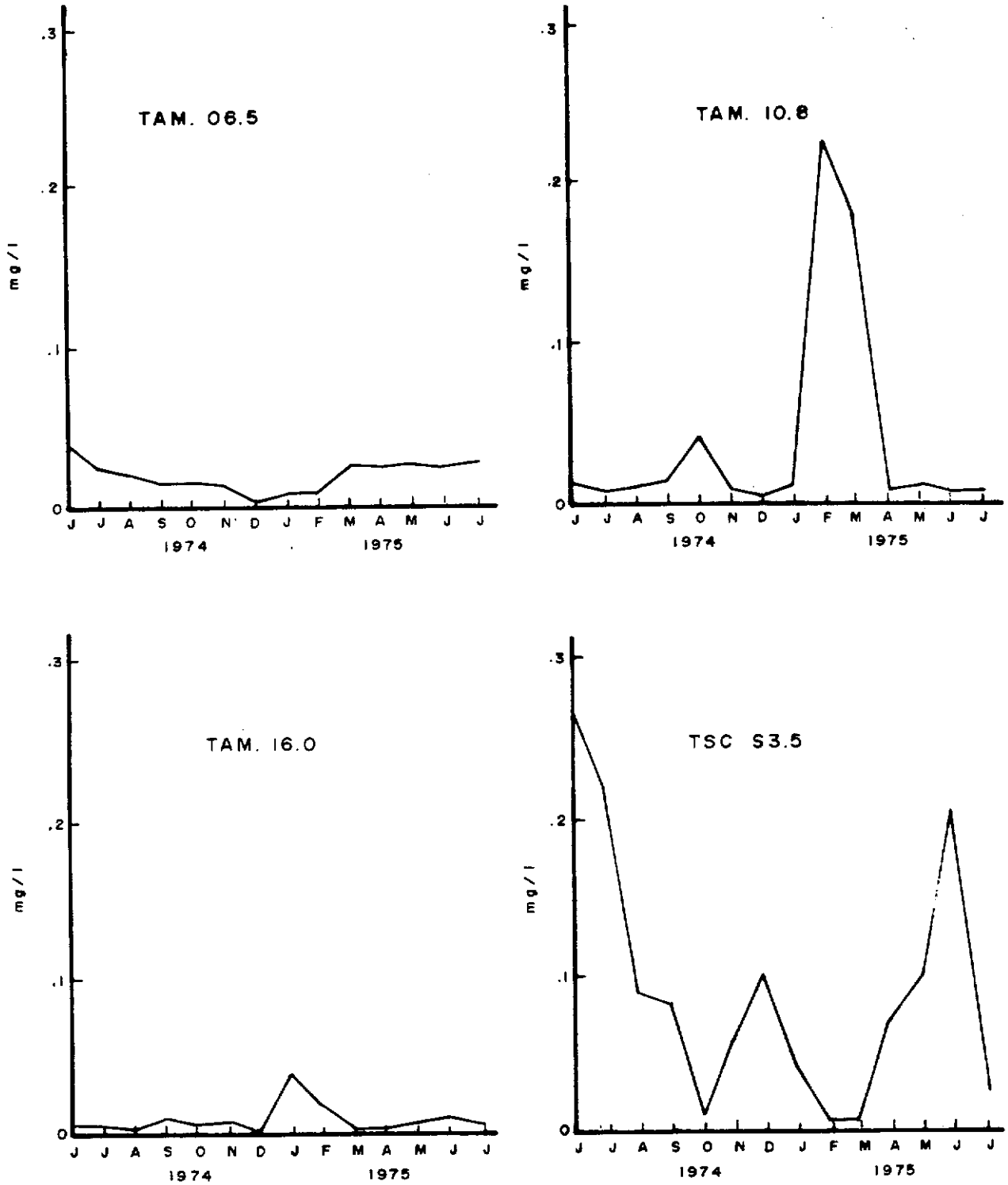

Figure 60 TOTAL PHOSPHORUS CONCENTRATIONS IN THE TAMIAMI CANAL AND SNAPPER CREEK

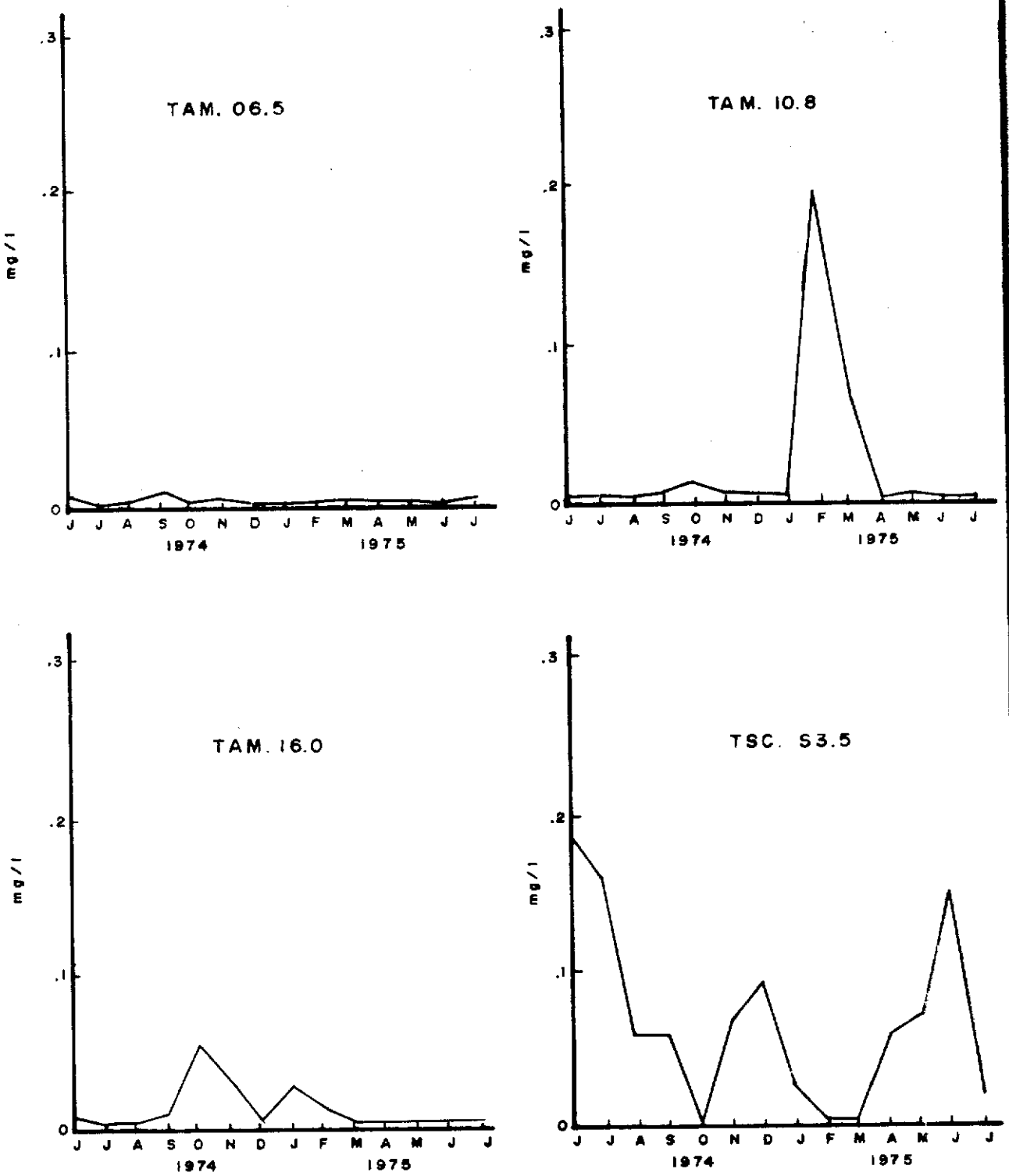

Figure 61 ORTHO-PHOSPHORUS CONCENTRATIONS IN THE TAMIAMI CANAL AND SNAPPER CREEK

and March.

Nitrogen. Total nitrogen concentrations (Fig. 62) on the Tamiami Canal and at the Snapper Creek Station were variable from month to month with no clear seasonal trends. The highest concentrations of total nitrogen (2.71 mg/l), for all four stations, occurred in November at Station TAM-16.0 and the lowest (1.04 mg/l) was at Station TAM-06.5 in March.

Dissolved inorganic nitrogen concentrations (Fig. 63), like total nitrogen, varied to a great extent from both month to month and station to station. The highest dissolved inorganic nitrogen concentration (1.28 mg/l) on the Tamiami Canal occurred in November, at Station TAM-16.0; the lowest concentration (0.08 mg/l) was in July 1975 at the same station. The station on Snapper Creek (TSC-S3.5) did not have quite as large a range for dissolved inorganic nitrogen, varying from a high of 1.21 mg/l in July 1974 to a low of 0.23 mg/l in July 1975. Seasonal trends in dissolved inorganic nitrogen concentrations were not evident on either the Tamiami Canal or Snapper Creek during this study.

All statistical analyses for both nitrogen and phosphorus on the Tamiami Canal and Snapper Creek were inconclusive. Highly significant station-month interactions, possibly due to the extremes of both the nitrogen and phosphorus concentrations, prevented a conclusive analysis.

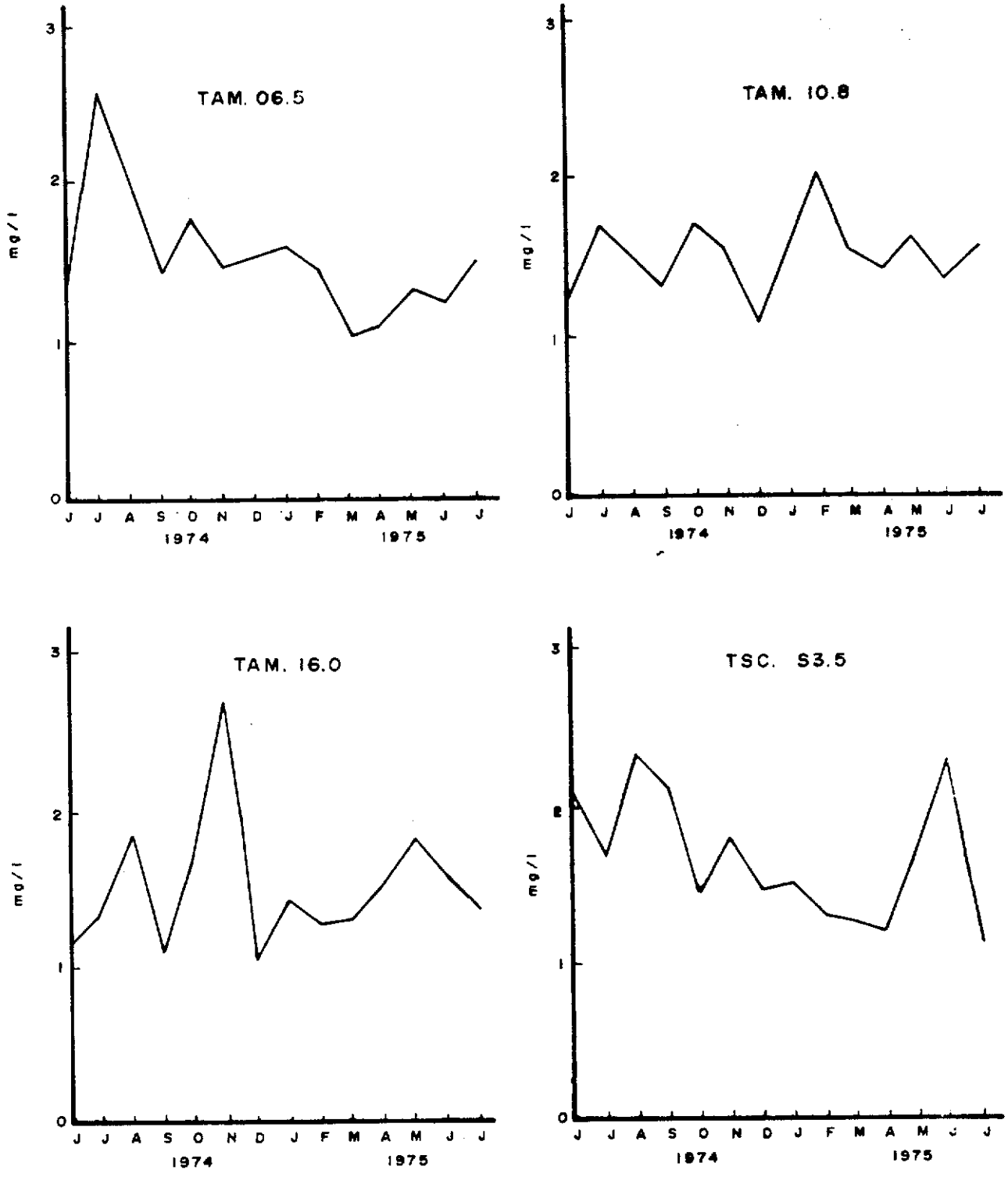

Figure 62 TOTAL NITROGEN CONCENTRATIONS IN THE TAMIAMI CANAL AND SNAPPER CREEK

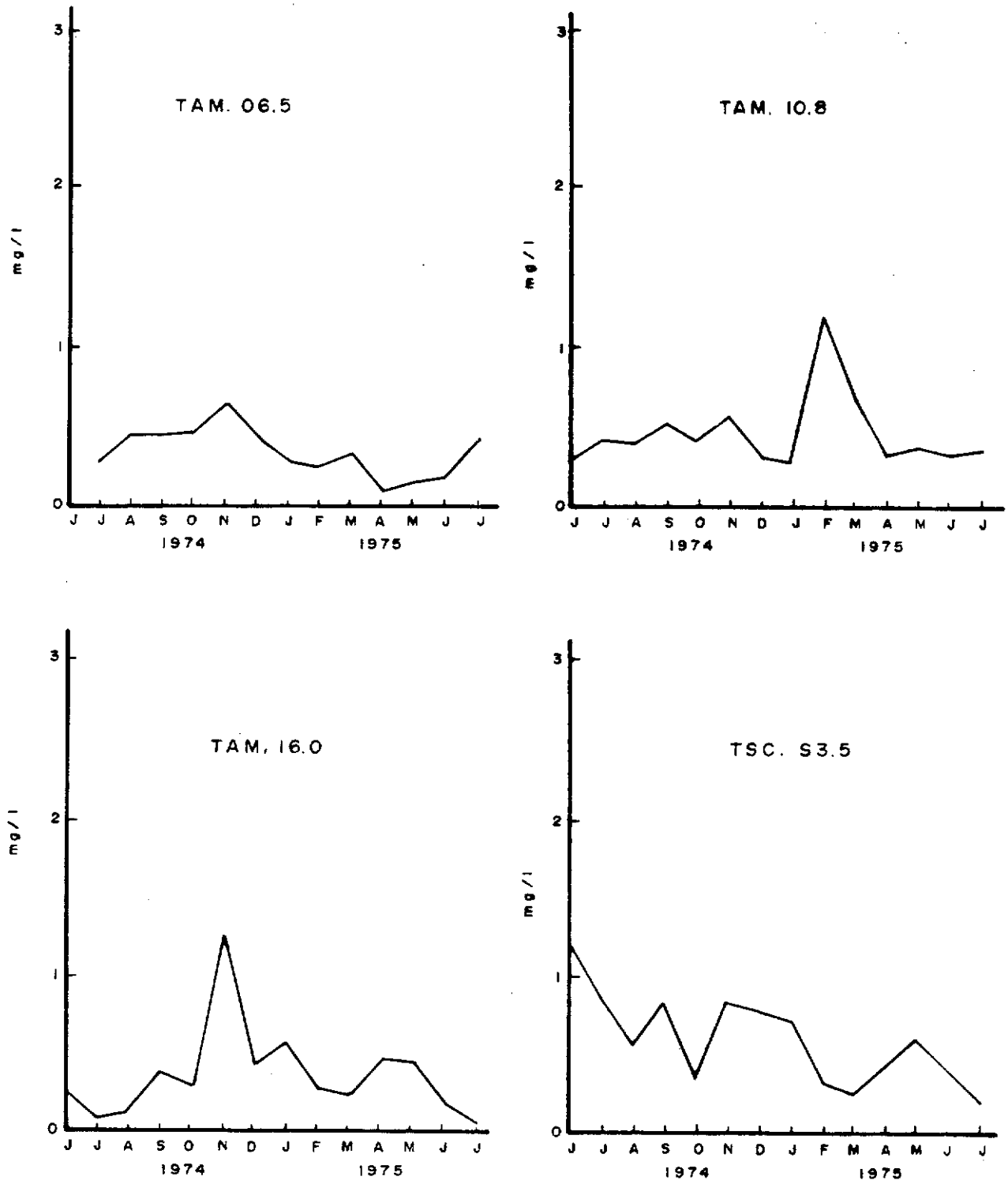

Figure 63 DISSOLVED INORGANIC NITROGEN CONCENTRATIONS IN THE TAMIAMI CANAL AND SNAPPER CREEK

DISCUSSION

Western C-51. Both nitrogen and phosphorus concentrations were highly variable during the entire study (Figs. 16, 17, 18 and 19). The irregular nature of this variability reflects the complexity of the hydrological conditions in C-51. The seasonal variation of nutrient concentrations which might be expected to result from the higher rainfall and runoff during the wet season was not evident from the data. Nitrogen and phosphorus concentrations in C-51 are a function not only of runoff from within the basin, but of the water entering through the S-5AE structure during periods of discharge. The design of the sampling program did not control for these two factors so their effects on nutrient concentrations cannot be readily assessed.

Periodic discharges of nitrogen laden water from the agricultural area (FCD, unpublished data) through the S-5AE structure appear to have a significant effect on NO_x concentrations. The station immediately downstream from S-5AE, WPB-22.0, had significantly higher (.10 significance level) NO_x concentrations than the stations farther downstream. When NOx and total nitrogen concentrations in the canal during periods of discharge at S-5AE were tested against the concentrations during periods of no S-5AE discharge they were not statistically different. The failure of this test, however, may be due to the inability to control for the source of the water discharged at S-5AE. Depending upon the particular hydrological conditions, the water discharged at S-5AE may consist primarily of high quality water from the L-8 canal (FCD, unpublished data) or relatively low quality water from L-12 and L-13 canals (unpublished data).

Total and ortho-phosphorus concentrations did vary significantly between months of the study (Tables 2 and 3). This variation could not be related to either S-5AE discharges or seasonal factors. Again the inability to

account for the source of the water discharged at S-5AE limited the sensitivity of this analysis.

Dissolved oxygen concentrations on C-51 were low, meeting the minimum standard for Class IV waters (4.0 mg/l) in only five months, January through May, of the study (Fig. 7). Several factors may be responsible for the higher dissolved oxygen concentrations during this period. Decreases in loadings of BOD (biological oxygen demand) and COD (chemical oxygen demand), as well as increases due to planktonic primary production may cause the increase in dissolved oxygen. This five month period corresponds to a period when the inflows at S-5AE exceeded the outflows at State Road 7, i.e. a net movement of water out of the canal due to irrigation withdrawals and seepage into the groundwater. The movement of water out of the canal indicates a decrease in BOD and COD loadings because of decreased runoff, as well as increased residence times allowing for increases in dissolved oxygen concentrations resulting from planktonic primary production. Changes in temperature do not appear to be a significant factor affecting the levels of dissolved oxygen because the saturation point was never reached (Fig. 7).

Low rainfall and consequent reductions in the basin runoff resulted in lower conductivities during the dry season (Fig. 10). When the S-5AE discharge was the main source of water to the canal, January through May, concentrations of sodium, potassium, magnesium and chloride increased relative to the preceding wet season months; however, these increases were not reflected by a discernible increase in conductivities. Magnesium concentrations were distinctly higher during this period, indicating higher concentrations of magnesium in the water from agricultural area west of S-5AE.

Hillsboro Canal. The water quality in this canal is influenced primarily by runoff from within the basin and releases of water from Conservation Area 1. During the wet season, runoff from within the Hillsboro basin is the major factor

influencing the water quality in the canal. Approaching the late dry season, January through April, the predominant water quality influence becomes the demand releases from Conservation Area 1 via the S-39 structure.

The influences of these two factors on the water quality can easily be seen by comparing wet season total nutrient concentrations with the dry season concentrations. Total nitrogen and total phosphorus concentrations (Figs. 31 and 33) were significantly higher in the wet season than in the dry season. (Appendix C). Runoff from the drainage basin during the wet season contains higher concentrations of both nitrogen and phosphorus than the low nutrient water from Conservation Area 1 (Waller and Earle, 1975) which results in the observed seasonal differences.

The improvement of the water quality in the Hillsboro Canal by the discharges from Conservation Area 1 was also made apparent by increased concentrations of dissolved oxygen (Fig. 22). This four month period, January through April, was the only time during the entire study that the dissolved oxygen standard was met. This evidence indicates that a desirable improvement in water quality could be achieved by decreasing the basin runoff or improving the quality of this runoff.

Unlike C-51, dissolved oxygen concentrations on the Hillsboro Canal tended to be vertically stratified (i.e. higher at the surface than at lower depths) (Fig. 21) during the majority of the study period. Several factors, including limited vertical mixing surface reaeration and planktonic primary production are probably responsible for the differences in the dissolved oxygen concentration with depth.

Levels of conductivity, sodium, magnesium and chloride increased as S-39 discharges became predominant over the basin load (Figs. 25, 26, 29 and 30). High concentrations of these elements are found in areas of Conservation Area 1 which are impacted by agricultural runoff (Gleason, 1974; Waller and Earle, 1975).

Unlike the macronutrients, sodium, magnesium and chlorides are relatively conservative, therefore the concentrations of these elements do not decrease appreciably with residence time in the Conservation Areas (Gleason, 1974, Waller and Earle, 1975). The fact that concentrations of these constituents in the canal increased with the predominance of S-39 discharges is an indication of the more highly mineralized nature of agricultural runoff compared to the runoff from within the Hillsboro drainage basin.

North New River. This canal, like the Hillsboro Canal, received dry season demand releases from the Conservation Areas. Unlike the Hillsboro Canal, however, these regulatory releases do not significantly influence the phosphorus concentrations in the canal. The low phosphorus concentrations (Figs. 46 and 47) found in the North New River did not vary significantly between the wet and dry seasons.

Total nitrogen concentrations in the North New River (Fig. 48) were higher than in any of the other canals. These high nitrogen concentrations are probably the result of high nitrogen loadings from within the basin as evidenced by the fact that dry season concentrations, derived mainly from Conservation Area 2, are significantly lower (Appendix C) than those in the wet season.

Dissolved oxygen concentrations followed the same pattern on the North New River as on the other canals. The predominance of high quality water from Conservation Area 2, combined with low BOD and COD loadings from runoff during the period from January through May resulted in dissolved oxygen concentrations in excess of 4.0 mg/l in all months during the period except March. Decreases in BOD and COD loadings appear to be the primary factor controlling the dissolved oxygen concentrations because planktonic primary production is probably negligible due to the low phosphorus concentrations.

Discharges from Conservation Area 2 into the North New River during the dry season affect the conductivities and concentrations of major constituents, with

the exception of potassium, in a manner similar to the Hillsboro Canal. Potassium concentrations on the North New River increased with Conservation Area discharges, whereas there were no changes on the Hillsboro Canal. The reason for this difference is the relatively low potassium concentrations in the North New River during the wet season.

Tamiami Canal and Snapper Creek. Phosphorus concentrations on the Tamiami Canal were comparable to those on the North New River. Snapper Creek, in contrast, had higher phosphorus concentrations than either the Tamiami Canal or North New River. Runoff from the drainage basin appears to have a major effect on the phosphorus concentrations in Snapper Creek because wet season concentrations of phosphorus were higher than the dry season concentrations (Fig. 60). The absence of seasonal differences in phosphorus concentrations on the Tamiami Canal suggests that runoff has little or no effect as far as phosphorus is concerned.

Total nitrogen concentrations on both Snapper Creek and the Tamiami Canal were significantly lower than they were on the North New River. Seasonal differences in total nitrogen, however, were not significant for either the Tamiami Canal or Snapper Creek. The reason for these relatively low total nitrogen concentrations on both canals is not evident.

Dissolved oxygen concentrations on the Tamiami Canal exceeded the 4.0 mg/l standard only in January, March and April and only in January and April on Snapper Creek. Unlike the other three canals the Tamiami Canal and Snapper Creek do not receive direct demand releases from the west during the dry season. Groundwater seepage is the main source of water in these canals during the dry season and is probably the reason for the relatively short period in which dissolved oxygen concentrations exceeded 4.0 mg/l

Conductivities on both Snapper Creek and the Tamiami Canal tended to increase slightly during the dry season (Fig. 54), however, this trend was not as strong as on the North New River and Hillsboro Canal. The southeastern end of

Conservation Area 3 which is the source of seepage water to the Tamiami Canal is not affected by agricultural runoff like the North New River and Hillsboro Canal areas and consequently has lower conductivities and levels of all major constituents except calcium (Waller and Earle, 1975). For this reason, dry season increases in most of the major constituents typical of both the Hillsboro Canal and the North New River did not occur on Snapper Creek or the Tamiami Canal.

Basin Comparison. As the above discussion has outlined, the five canals included in this study have some common characteristics, as well as their own unique features. Nutrient concentrations are one of the characteristics which tend to be unique to each of the canals. Ranking the canals in decreasing order according to their average nutrient concentrations results in the following:

Phosphorus

1. Hillsboro (.12)
2. C-51 (.10)
3. Snapper Creek (.09)
4. Tamiami (.02)
5. North New River (.01)

Nitrogen

1. North New River (2.04)
2. C-51 (1.76)
3. Snapper Creek (1.66)
4. Hillsboro (1.52)
5. Tamiami (1.51)

As these rankings show, two canals, the North New River and the Hillsboro, have opposite trends in nutrient concentrations. The North New River has the lowest phosphorus concentrations but the highest nitrogen concentration and the Hillsboro Canal which has the highest phosphorus concentrations has one of the lowest nitrogen concentrations.

Dissolved oxygen concentrations on each of the canals, followed similar seasonal patterns. Late dry season levels of dissolved oxygen were generally higher than during the rest of the year. The factor which probably has the most

influence on this common trend is the decrease of BOD and COD loading from the drainage basin during periods of low rainfall.

The C-51, Hillsboro, and North New River Canals all had similar levels of major constituents during the dry season. The similarity of these canals with respect to the major constituents seems to be due to agricultural runoff. Each of these canals receives discharges of water derived from agricultural runoff at least part of the year and it is during this period that the levels of major constituents are similar. Further evidence of the effects of agricultural runoff is the lower concentrations of major constituents found in both the Tamiami Canal and Snapper Creek, the only canals not receiving agricultural runoff.

Phosphorus Exports. Rates for the areal export of nutrients from the four canal basins allows further comparisons between basins and with export rates reported in literature. An areal export rate is simply the weight of nutrient discharged from a basin during a specified time frame, in this case one year, divided by the area of the basin. All export rates presented here have been computed for the year June 1, 1974 to May 31, 1975.

Areal exports of phosphorus from four of the study basins (Table 8) ranged from 0.012 g/m^2-yr to 0.085 g/m^2-yr. The Hillsboro Canal, which has the highest export rate, is the most agricultural of the basins, having approximately 42% of the total area in agriculture. Improved pasture accounts for nearly half (48%) of this agricultural usage (Appendix B) and several sources (Task Committee on Agricultural Runoff and Drainage, Huber, W. C., et al, 1976) have implicated improved pasture as a source of relatively high phosphorus loading. This extensive pasture area may be the reason for the high phosphorus export observed for the Hillsboro Canal.

The North New River Canal is at the other end of the spectrum with respect to phosphorus exports, having an areal export rate approximately 7 times less

TABLE 8. CALCULATED NUTRIENT LOADS AND EXPORTS FOR THE YEAR JUNE 1974 - MAY 1975.

	C-51	Hillsboro	North New River	Tamiami
Flow (m^3) June 1974-May 1975	161,014,026	103,580,657	79,144,271	61,084,874
Area (km^2)	302.91	261.06	74.33	183.47
Nitrogen Load (kg)	301,152	173,475	148,070	108,073
Phosphorus Load (kg)	17,339	22,210	873	4,532
Areal Export (g/m^2-yr)				
Nitrogen	0.99	0.66	1.99	0.59
Phosphorus	0.057	0.085	0.012	0.025

(0.012 g/m^2-yr.) than that observed for the Hillsboro Canal. The low export of phosphorus from the North New River Basin is particularly surprising since approximately 49% of the basin is urban. Brezonik and Shannon (1971) reported nutrient export rates from various land uses and only muck farms exceeded urban areas with respect to phosphorus exports (Table 9) in their breakdowns.

Geological differences between the Hillsboro Canal and North New River Canal basins are probably the major factor causing the largest differences in the observed phosphorus export rates. The eastern Hillsboro Canal basin is part of the Anastasia Formation which consists of coquina, sand and calcareous sandstone and shell marl (Hoffmeister, 1974). The North New River basin, in contrast, is located in Miami Limestone which is largely $CaCO_3$. Calcium carbonate is capable of combining with phosphorus to form insoluble apatites (Stumm and Morgan, 1970), resulting in removal of phosphorus from the water. This same phenomenon is probably responsible for the low phosphorus exports from the largely urban (37%) Tamiami Canal basin. Discharges of water into canals which do not allow for contact between the limestone and water (i.e. pipeline) could be expected to cause significant increases in the phosphorus export.

The land use breakdown shown in Table 9 and the export rates for phosphorus reported by Brezonik and Shannon (1971) were used to calculate expected loads from each of the basins. The results (Table 10) indicate that the North New River and the Tamiami Canal would be expected, based on the existing land uses, to have higher loads of phosphorus than those observed. Both C-51 and the Hillsboro Canal, on the other hand, had higher phosphorus loads than would be expected on the basis of the existing land uses.

Nitrogen Exports. The areal export rates for nitrogen from the four basins (Table 8) ranged from 8 to 166 times the rates for phosphorus export. The North New River which had the lowest export rate for nitrogen, nearly two times greater than any of the other basins, and an order of magnitude greater than any

TABLE 9. ESTIMATED VS. CALCULATED NUTRIENT EXPORTS FROM LOWER EAST COAST CANALS.

Land Use	Nitrogen g/m^2-yr	Phosphorus g/m^2-yr	C-51			Hillsboro			North New River			Tamiami		
			Area (m^2)	Load N(kg)	Load P(kg)	Area (m^2)	Load N(kg)	Load P(kg)	Area (m^2)	Load N(kg)	Load P(kg)	Area (m^2)	Load N(kg)	Load P(kg)
1. Urban	0.88	0.110	16,963,989	14,298	1,866	39,208,048	34,503	4,313	23,512,223	20,691	2,586	57,802,015	50,866	6,358
2. Unproductive and Cleared	0.18	0.006	78,581,977	14,145	472	50,761,744	9,137	305	2,052,970	3,695	123	60,639,132	10,915	364
3. Pasture	0.85	0.018	32,830,640	27,906	591	53,466,256	45,560	965	14,702,229	12,497	265	10,428,491	8,864	188
4. Citrus	2.24	0.018	37,089,640	83,081	668	2,773,104	6,212	50	1,161,448	2,602	21	-	-	-
5. Muck Farms	0.11	0.135	13,106,864	1,442	1,769	53,356,952	5,869	7,203	9,619,378	1,058	1,299	9,529,762	1,048	1,287
6. Forested Area	0.24	0.008	80,017,817	19,204	640	46,090,204	11,062	369	841,746	202	7	2,113,227	507	17
7. Wetland	0.24[1]	0.008[1]	43,672,341	10,481	349	14,618,509	3,508	117	8,259,634	1,982	66	37,843,762	9,083	303
Total Estimated Loads				171,187	6,355		115,851	13,322		42,727	4,367		81,283	8.517
Total Calculated Loads				301,152	17,339		173,475	22,210		148,070	873		108,073	4,532

[1]Same value as that used for forested areas.

TABLE 10. COMPARISON OF ESTIMATED NUTRIENT LOADS AND COMPUTED LOADS.

	Nitrogen (kg/yr)		Phosphorus (kg/yr)	
Canal	Estimated	Calculated	Estimated	Calculated
C-51	171,187	301,152	6,355	17,339
Hillsboro	115,851	173,475	13,322	22,210
North New River	42,727	148,070	4,367	873
Tamiami	81,283	108,073	8,517	4,532

of the 223 sub-drainage basins reported on Omernik (1976). The Hillsboro Canal basin, which had the highest phosphorus export rate, had a relatively low areal export rate for nitrogen (Table 8).

The reason for the relatively high export rates of nitrogen from the North New River basin may be a result of the largely urban land use in this basin. Brezonik and Shannon (1971) report that rates for nitrogen exports from urban land uses exceed all other land uses except citrus (Table 9). The Tamiami Canal basin, however, which is 37% urban (Table 1) had far lower exports of nitrogen.

CONCLUSIONS

1. Dissolved oxygen concentrations in all of the canals were below 4.0 mg/l most of the year. Increases in dissolved oxygen were evident in all canals during the low flow period from January through May. Decreases in BOD loads because of decreased runoff is probably the major factor contributing to the increases in dissolved oxygen during this period.
2. Nutrients and the major constituents were highly variable in all of the canals. The variability of these water parameters in the canals reflects hydrological conditions in each of the basins, rather than characteristics of the canals themselves. Nutrient concentrations in the Hillsboro, North New River and Tamiami Canals tended to be higher in the wet season than in the dry season. Major constituents tended to follow the opposite trend, i.e. higher during the dry season than in the wet season.
3. Ranking of the canals from highest to lowest according to the average total phosphorus concentrations for the study results in the following:

    1. Hillsboro Canal .12 mg/l
    2. C-51 .10 mg/l
    3. Snapper Creek .09 mg/l
    4. Tamiami Canal .02 mg/l
    5. North New River .01 mg/l

    The same ranking using the average total nitrogen concentration results in the following:

    1. North New River 2.04 mg/l
    2. C-51 1.76 mg/l
    3. Snapper Creek 1.66 mg/l
    4. Hillsboro Canal 1.52 mg/l
    5. Tamiami Canal 1.51 mg/l

4. Areal exports of phosphorus ranged from .012 g/m^2-yr on the North New River to .085 g/m^2-yr on the Hillsboro Canal. Nitrogen areal export rates ranged from .59 g/m^2-yr on the Tamiami to 1.99 g/m^2-yr on the North New River. Areal export rates for various land uses taken from Brezonik and Shannon, 1971, were applied to the existing land uses within each of the basins to determine the expected nutrient exports. The actual export rates for the Hillsboro and C-51 canals exceeded the areal export rates for both nitrogen and phosphorus that would be expected according to literature values. The areal export rates of nitrogen from the Tamiami and North New River basins exceeded the values that would be expected based on the literature; however, phosphorus exports were less than would be predicted using the literature values.

BIBLIOGRAPHY

Brezonik, P. and E. Shannon, 1971. Trophic State of Lakes in North Central Florida, Water Resources Research Center, University of Florida, Pub. 13.

Gleason, P., P. Stone, D. Hallett, and M. Rosen, 1974. Preliminary Report on the Effect of Agricultural Runoff on the Periphytic Algae of Conservation Area 1. Central and Southern Florida Flood Control District, unpublished manuscript.

Hoffmeister, J. E., 1974. Land from the Sea, the Geological Story of Florida, University of Miami Press, Coral Gables.

Huber, W. C., J. P. Heaney, P. B. Bedient, and J. P. Bowden, 1976. Environmental Resources Management Studies in the Kissimmee River Basin. Department of Environmental Engineering Sciences, University of Florida.

Nie, N. H., C. H. Hull, J. G. Jenkins, K. Steinbrenner, and D. H. Bent, 1975. Statistical Package for the Social Sciences. McGraw-Hill, New York.

Omernik, J. M., 1976. The Influence of Land Use on Stream Nutrient Levels. U. S. Environmental Protection Agency. EPA-600/3-76-014.

South Florida Water Management District, 1977. Water Use and Supply Development Plan. Draft. West Palm Beach, Florida.

Storch, W. V., S. Kelman, A. T. Hjelmfelt, G. S. McGregor, L. B. Baldwin, and T. L. Wirth, Quality Aspects of Agricultural Runoff and Drainage. Task Committee on Agricultural Runoff and Drainage, Unpublished manuscript.

U. S. Army Corps of Engineers, 1968. Water Resources for Central and Southern Florida. U. S. Government Printing Office.

Waller, B. G. and J. E. Earle, 1975. Chemical and Biological Quality of Water in a Part of the Everglades, Southeastern Florida. U. S. Geological Survey, Water-Resources Investigations 56-75.

APPENDIX A

LAND USE BREAKDOWNS FOR THE C-51 HILLSBORO, NORTH NEW RIVER AND TAMIAMI CANAL BASINS

Source: South Florida Water Management District
Land Resources Division

APPENDIX A

WESTERN C-51 LAND COVER ANALYSIS-FROM FCD LAND PLANNING DIVISION

	Acres	Percent of Total
1. URBAN		
Residential		
Low Density	3591.28	
Med. Density	155.33	
High Density		
Multi-Family	28.01	
Mobile Home		
Total	3774.62	5%
Commercial & Service		
Sales & Service	16.18	
Cultural & Entertainment	223.19	
Total	239.37	0.3%
Industrial	6.35	
Institutional		
Education		
Medical		
Religious		
Military		
Government	9.36	
Transportation		
Airport		
Transmission Lines		
Highways		
Water Supply Plant	5.39	
Sewerage Plant		
Radio Station		
Open & Others		
Recreation		
Golf Course	154.73	
Parks		
Under Development	14,126.72	
Cemetery		
Total	14,281.45	19.1%
Urban Total		24.5%
2. AGRICULTURAL		
Improved Pasture	7832.68	
Nursery		
Truck Crops	3237.60	
Citrus	9161.72	
Dairy Farm	21.82	
Fish Farm	25.45	
Horse Training	229.79	
Total	20,509.01	27.4%
3. FORESTED AND WETLANDS		
Forested Land		
Forested	9.33	
Mixed Forest	999.63	
Pine Flatwoods	9724.50	
Australian Pines	30.87	
Coastal Sand Pines	8812.56	
Brazilian Pepper	53.51	
Oldfields	2632.89	
Total	22,263.29	29.7%
Open & Undeveloped	56.14	
Rangeland		
Grass	2554.13	
Palmetto	135.25	
Total	2689.38	3.6%
Wetlands Fresh		
Cypress	2982.68	
Sloughs	2161.93	
Non-Forested	5643.14	
Total	10,787.75	14.4%
Barren Lands		
Gravel Pits	41.11	
Water	186.91	0.2%

APPENDIX A

HILLSBORO CANAL LAND COVER ANALYSIS-FROM FCD LAND PLANNING DIVISION

	Acres	Percent of Total
1. URBAN		
Residential		
Low Density	1793	
Med. Density	2304	
High Density	272	
Multi-Family	332	
Mobile Home	398	
Total	5099	8%
Commercial & Service		
Sales & Service	121	0.2%
Industrial		
Industrial	444	0.7%
Institutional		
Education	883	
Medical	81	
Government	9	
Total	973	1.5%
Transportation		
Airport	125	
Electrical Power	31	
Transmission Lines	305	
Highway	537	
Water Supply	6	
Sewerage Plant	65	
Total	1069	1.7%
Open & Others		
Recreation	116	
Golf Course	1979	
Parks	53	
Under Development	4256	
Total	6404	9.9%
Urban Total		21.9%
2. AGRICULTURE		
Truck Crops	12,401	
Improved Pasture	13,144	
Citrus	685	
Sod Farms	456	
Nursery	323	
Feed Lots	56	
Fish Farms	33	
Horse Training	4	
Poultry	6	
Total	27,108	42.0%
3. FORESTED AND WETLAND		
Forested Land		
Forested	1794	
Pine Flatwoods	8218	
Sandpine	571	
Australian Pine	35	
Brazilian Pepper	525	
Oldfield	5970	
Total	17,113	26.5%
Open & Undeveloped	1870	
Rangeland		
Rangeland	82	
Grass	35	
Palmetto	242	
Total	359	0.5%
Wetlands Forested Fresh		
Forested Wetlands	911	
Cypress	697	
Total	1608	2.5%
Wetlands Non-Forested	2003	3.1%
Barren Land		
Pits	157	0.2%
Water		
Open	116	
Canal	66	
Total	182	0.3%

APPENDIX A

NORTH NEW RIVER CANAL LAND COVER ANALYSIS

	Acres	Percent of Total
1. URBAN		
Residential		
Low Density	2100	
Med. Density	2211	
High Density		
Multi-Family	31	
Mobile Home	11	
Total	4353	24%
Commercial & Service		
Sales & Service	110	
Cultural & Entainment	21	
Total	131	1%
Industrial		
Industrial		
Junkyard		
Total		
Institutional		
Education	197	
Medical		
Government	4	
Total	201	1%
Transportation		
Sewerage Plant	4	
Highways	58	
Water Supply Plant	28	
Solid Waste Disposal	10	
Total	100	1%
Open & Others		
Golf Courses	1025	
Under Development	3094	
Total	4119	23%
2. AGRICULTURAL		
Improved Pasture	2129	
Truck Crops	2377	
Citrus	287	
Fish Farm	6	
Total	4799	26%
3. FORESTED AND WETLANDS		
Forested Land		
Forested	143	
Mixed Forest	65	
Total	208	1%
Open & Undeveloped	748	4%
Rangeland		
Rangeland	934	
Grass	570	
Total	1504	8%
Wetlands Fresh		
Wetlands	1316	
Forested	39	
Melaleuca	334	
Non-Forested	138	
Total	1827	10%
Barren Lands		
Gravel Pits	46	
Spoil Areas	9	
Total	55	.3%
Water	214	1%

APPENDIX A

TAMIAMI CANAL LAND COVER ANALYSIS-FROM FCD LAND PLANNING DIVISION

	Acres	Percent of Total
1. URBAN		
Residential		
Low Density	3855	
Med.Density	4588	
High Density	108	
Multi-Family	959	
Mobile Home	406	
Total	9916	22%
Commercial & Service		
Sales & Service	233	
Shopping Center	57	
Total	290	1%
Industrial		
Industrial	852	
Junkyard	95	
Total	947	2%
Institutional		
Education	895	
Medical	16	
Total	911	2%
Transportation		
Transmission Lines	106	
Radio Station	71	
Electrical Power	11	
Sewerage Plant	13	
Airport	1335	
Railroad	15	
Highway	297	
Total	1848	4%
Open & Others		
Recreation	69	
Golf Course	366	
Parks	24	
Under Development	2477	
Cemetery	60	
Total	2996	7%
Urban Total		37%
2. AGRICULTURAL		
Improved Pasture	2576	
Nursery	5	
Truck Crops	2329	
Sod Farms	20	
Total	4930	11%
3. FORESTED AND WETLANDS		
Forested Land		
Forested	522	
Oldfields	1477	
Total	1999	4%
Open & Undeveloped	1443	3%
Rangeland		
Rangeland	6376	
Grass	2536	
Total	8912	20%
Wetlands Fresh		
Sawgrass	9348	21%
Water Open	1279	3%
Barren Lands		
Gravel Pits	517	1%

APPENDIX B

ANALYTICAL METHODS

AUTOANALYZER

Determination	Method	Range	Sensitivity
Alkalinity	1. Methyl Orange; Technicon AutoAnalyzer II, method #111-71W	0-10 meq/l	0.10 meq/l 2% of full scale
	2. Potentiometric titration Ref. Standard Methods, 13th Edition, p. 52-56.	0-10 meq/l	0.3 meq/l
Ammonia	Berthelot reaction Technicon AA II, method #154-71W Ref: D. D. Van Slyke & A. J. Hillen, Bio Chem. 102, p. 499, 1933; S. Kallman, Presentation, April 1967, San Diego, Calif.; W. T. Bolleter, C. J. Bushman & P. N. Tidwell, Anal. Chem. 33, p. 592, 1961; J. A. Tellow & A. L. Wilson, Analyst, 89, p. 453, 1964; A. Tarugi & F. Lenci, Boll Chim Farm, 50, p. 907, 1912; FWPCA Methods of Chem. Anal. of Water & Waste Water. Nov. 1969, p.137.	0-0.50 ppm	0.010 ppm 2% of full scale
Chloride	Ferric Thiocyanate complex Technicon AA II, method #99-70W Ref: Automatic Analysis of Chlorides in Sewage, James E. O'Brien, Wastes Engineering, Dec. 1962; D. M. Zall, D. Fisher & M. D. Garner, Anal. Chem. 28, 1956, p. 1665	0-200 ppm	4.0 ppm 2% of full scale
Nitrite	Diazotization method which couples with N-1-naphthylene-diamine dihydrochloride. Technicon AA II; method #120-70W, modified for linear sensitivity. Ref. Standard Methods, 12th edition, 1965, p. 205	0-0.200 ppm	.004 ppm 2% of full scale
Nitrate	Same as Nitrite with Cadmium Reduction column Technicon AA II, method #100-70W, modified for linear sensitivity.	0-0.200 ppm	.004 ppm 2% of full scale
Nitrogen, Total Kjeldahl	Digestion with H_2SO_4 and HgO catalyst followed by Ammonia determination as described above, modified diluent reagent to neutralize Kjeldahl digestion mixture. Technicon AA II, method #146-71A Ref. Standard Methods, 13th edition, p. 244	0-3.0 ppm	0.06 2% of full scale

APPENDIX B (Continued)

AUTOANALYZER

Determination	Method	Range	Sensitivity
Ortho-Phosphate	Phosphomolybdenum blue complex with ascorbic acid reduction. Technicon AA II; method #155-71W Ref. J. Murphy & J. P. Riley, Anal. Chim. Acta, 27, p. 30, 1962.	0-0.100 ppm	.002 2% of full scale
Phosphate, Total	Same as Ortho-Phosphate with persulfate digestion. Modified Standard Methods procedure: 13th edition, p. 525, 1971. Technicon AA II; method #93-70W.	0-0.100 ppm	.002 2% of full scale
Silicate	Ascorbic acid reduction of silicomolybdate complex to "Molybdenum blue", Technicon AA II, method #105-71W.	0-20 ppm	0.4 ppm 2% of full scale
Sulfate	Barium chloride, Methylthymol Blue chelation, Technicon AA II, method #118-71W	0-250 mg/l	5 mg/l 2% of full scale

ATOMIC ABSORPTION

Parameter	Wavelength	Flame	Comments
Sodium	589.0 nm-vis. (SLIT 1.4 nm)	Air and acetylene	Dual capillary system (DCS) as described by T.H. Miller and W. H. Edwards, Atomic Absorption Newsletter 15, No. 3 (1976).
Potassium	766.5 nm-vis. (SLIT 1.4 nm)	Air and acetylene	Sample treatment as described for sodium.
Calcium	422.7 nm-vis. (SLIT 0.7 nm)	Air and acetylene	Same
Magnesium	285.2 nm-uv (SLIT 0.7 nm)	Air and acetylene	Same

APPENDIX C

ANALYSIS OF VARIANCE TABLES FROM STATISTICAL TESTING OF DATA FROM C-51, HILLSBORO, NORTH NEW RIVER, TAMIAMI AND SNAPPER CREEK CANALS

Factors listed under the Source of Variation Column are considered significant if the value in the Significance of F column is equal to or less than 0.005.

APPENDIX C

ANALYSIS OF VARIANCE TABLE FOR TOTAL PHOSPHORUS CONCENTRATIONS ON WESTERN C-51

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Station	.002	3	.001	.112	.999
Month	.208	13	.016	3.128	.002
Station by Month Interaction	.115	39	.003	.577	.999
Residual	.292	57	.005		
Total	.617	112	.006		

ANALYSIS OF VARIANCE TABLE FOR ORTHO-PHOSPHORUS CONCENTRATIONS ON WESTERN C-51

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Station	.007	3	.002	.565	.999
Month	.202	13	.016	3.999	.001
Station by Month Interaction	.068	39	.002	.449	.999
Residual	.218	56	.004		
Total	.494	111	.004		

APPENDIX C

TWO WAY ANALYSIS OF VARIANCE TABLE FOR NO_x CONCENTRATIONS ON WESTERN C-51

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Station	1.882	3	.627	2.993	.039
Month	7.303	13	.562	2.680	.007
Station-Month Interaction	8.700	39	.223	1.064	.416
Residual	9.851	47	.210		
Total	27.566	102	.270		

ANALYSIS OF VARIANCE TABLE FOR TOTAL PHOSPHORUS CONCENTRATIONS ON THE HILLSBORO CANAL

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Station	.001	2	.000	.112	.999
Month	.623	13	.048	11.752	.001
Station-Month Interaction	.027	26	.001	.256	.999
Residual	.155	38	.004		
Total	.806	79	.010		

APPENDIX C

ANALYSIS OF VARIANCE TABLE FOR ORTHO-PHOSPHORUS CONCENTRATIONS ON THE HILLSBORO CANAL.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Station	.006	2	.003	.827	.999
Month	.513	13	.039	10.485	.001
Station-Month Interaction	.039	26	.001	.396	.999
Residual	.139	37	.004		
Total	.702	78	.009		

ANALYSIS OF VARIANCE TABLE FOR WET SEASON VS. DRY SEASON CONCENTRATIONS OF TOTAL PHOSPHORUS ON THE HILLSBORO CANAL.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Between Seasons	.0668	1	.0668	7.048	.010
Within Seasons	.7391	78	.0095		
Total	.8059	79			

APPENDIX C

ANALYSIS OF VARIANCE FOR WET SEASON VS DRY SEASON CONCENTRATIONS OF ORTHO-PHOSPHORUS ON THE HILLSBORO CANAL.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Between Seasons	.0298	1	.0298	3.412	.069
Within Seasons	.6723	77	.0087		
Total	.7021	78			

ANALYSIS OF VARIANCE TABLE FOR WET SEASON VS DRY SEASON TOTAL NITROGEN CONCENTRATIONS IN THE HILLSBORO CANAL.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Between Seasons	3.0070	1	3.0070	15.983	.000
Within Seasons	12.6055	67	.1881	.1881	
Total	15.6124	68			

APPENDIX C

ANALYSIS OF VARIANCE TABLE FOR CHLORIDE CONCENTRATIONS ON THE NORTH NEW RIVER.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Station	107.347	2	53.674	.065	.999
Month	105,337.604	13	8,102.893	9.799	.001
Station-Month Interaction	1,486.594	26	57.177		.999
Residual	31,421.455	38	826.880		
Total	138,270.315	79	1,750.257		

ANALYSIS OF VARIANCE TABLE FOR TOTAL PHOSPHORUS CONCENTRATIONS ON THE NORTH NEW RIVER.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Between Stations	.000	2	.000	.185	.999
Between Months	.003	13	.000	1.041	.436
Station-Month Interaction	.003	26	.000	.500	.999
Residual	.008	38	.000		
Total	.013	79			

APPENDIX C

ANALYSIS OF VARIANCE TABLE FOR ORTHO-PHOSPHORUS CONCENTRATIONS ON THE NORTH NEW RIVER

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Between Stations	.000	2	.000	2.250	.117
Between Months	.000	13	.000	1.275	.269
Station-Month Interaction	.000	26	.000	.980	.999
Residual	.000	38	.000		
Total	.000	79	.000		

ANALYSIS OF VARIANCE TABLE FOR CHLORIDE CONCENTRATIONS ON THE TAMIAMI CANAL AND SNAPPER CREEK

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance of F
Station	2243.830	3	747.943	2.580	.064
Month	6611.866	13	545.920	1.883	.056
Station-Month Interaction	6611.866	39	169.535	.585	.957
Residual	14202.547	49	289.848		
Total	30339.209	104	291.723		

APPENDIX C

ANALYSIS OF VARIANCE TABLE FOR TOTAL NITROGEN VARIATION BY SEASON ON THE NORTH NEW RIVER.

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F	Significance of F
Season	1	2.2078	2.2078	16.682	.000
Within Seasons	65	8.6023	.1323		
Total	66	10.8101			

APPENDIX D

WATER CHEMISTRY DATA FROM THE C-51, HILLSBORO, NORTH NEW RIVER, TAMIAMI AND SNAPPER CREEK CANALS

Units in mg/l except as follows:

Nutrient forms: mg N or P/l
Alkalinity: meq/l

NO_x = NO_2 + NO_3

Total N = Total Nitrogen

T-PO_4 = Total Phosphorus

O-PO_4 = Ortho Phosphorus

Blank indicates missing data.

< indicates results less than quoted limit of sensitivity.

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

1. C-51 Station WPB-12.0

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
6/14/74	0.450	0.410	0.040	0.18	2.44	2.89
6/14/74						
6/28/74	0.536	0.496	0.040	0.23	1.13	1.67
7/12/74	0.204	0.176	0.028	0.21	1.43	1.63
7/26/74	0.180	0.157	0.023	0.22	1.83	2.01
8/ 7/74	0.252	0.227	0.025	0.15	1.36	1.61
8/22/74	0.217	0.195	0.022	0.53	1.46	1.68
9/ 6/74	0.108	0.100	0.008	0.08	0.68	0.79
9/18/74	0.170	0.150	0.020	0.03		
10/ 4/74	0.235	0.222	0.013	0.02	1.55	1.79
10/16/74	0.128	0.117	0.011	0.09	1.99	2.12
10/29/74	0.181	0.170	0.011	0.14	0.87	1.05
11/14/74	0.095	0.091	< 0.004	0.03	0.99	1.09
11/27/74	0.110	0.106	< 0.004	0.09	0.72	0.83
12/18/74	0.343	0.309	0.034	0.24	0.93	1.27
1/ 6/75	0.028	0.023	0.005	0.02	0.76	0.79
1/23/75			0.017	0.08	0.71	
2/19/75	0.359	0.355	< 0.004	0.08	1.01	1.37
3/ 6/75	1.323	1.186	0.137	0.28	2.01	3.33
3/21/75	0.069	0.047	0.022	0.11	0.97	1.04
4/ 4/75	0.287	0.280	0.007	0.04	0.66	0.95
4/18/75	0.286	0.277	0.009	0.02	1.05	1.34
5/ 2/75	0.168	0.162	0.006	0.03	1.29	1.46
5/16/75	0.125	0.117	0.008	0.17	1.19	1.32
5/30/75	0.176	0.156	0.020	0.11	1.16	1.34
6/11/75	0.190	0.169	0.021	0.19	1.83	2.02
6/27/75			0.039	0.31	1.69	
7/ 9/75			0.033	0.21	1.57	
7/25/75	0.259	0.220	0.039	0.29	1.72	1.98

APPENDIX D-1 (Continued)

Date Mo/Day/Yr	O-PO_4	T-PO_4	Na	K	Ca	Mg
6/14/74	0.019	0.048	29.00	1.20	64.40	10.50
6/14/74						
6/28/74	0.026	0.062	62.00	3.60	63.40	8.40
7/12/74	0.118	0.157	20.00	1.90	46.80	3.60
7/26/74	0.041	0.065	37.00	1.60	77.80	6.30
8/ 7/74	0.040	0.092	23.00	1.50	53.80	3.50
8/22/74	0.050	0.083	30.00	1.90	69.80	4.80
9/ 6/74	0.025	0.061	37.00	2.10	88.80	5.40
9/18/74	0.036	0.096	104.00	5.00	82.50	16.80
10/ 4/74	0.035	0.069	20.00	1.50	44.80	6.80
10/16/74	0.140	0.261	22.00	2.30	55.60	3.60
10/30/74	0.031	0.040	50.00	2.50	95.80	6.40
11/14/74	0.021	0.042	44.00	2.20	80.60	5.40
11/27/74	0.203	0.225	24.00	3.60	77.20	4.20
12/18/74	0.029	0.031	45.00	3.25	87.40	7.20
1/ 6/75	0.182	0.200	44.60	3.00	95.80	8.10
1/23/75	0.150	0.168	29.10	2.50	88.00	4.80
2/19/75	0.011	0.047	70.70	4.40	62.20	13.60
3/ 6/75	0.076	0.099	98.10	6.10	86.80	22.30
3/21/75	0.229	0.236	44.00	3.10	88.70	7.60
4/ 4/75	0.037	0.048	57.50	4.50	52.40	15.30
4/18/75	0.027	0.055	63.60	4.10	57.60	17.80
5/ 2/75	0.024	0.053	61.70	4.10	56.60	16.40
5/16/75	0.039	0.058	55.40	4.10	57.70	14.70
5/30/75	0.018	0.032	61.80	2.50	85.70	5.50
6/13/75	0.006	0.025	49.20	2.80	81.10	8.30
6/27/75	0.044	0.088	45.50	2.70	84.50	7.40
7/ 9/75	0.127	0.163	28.00	2.02	67.30	5.30
7/25/75	0.044	0.058	52.49	1.93	87.14	6.15

APPENDIX D-1 (Continued)

Date Mo/Day/Yr	Cl	SO_4	SiO_2	Alk
6/14/74	135.1		13.4	4.85
6/14/74				
6/28/74	109.2		10.2	4.17
7/12/74	49.8		6.8	3.21
7/26/74	81.6		9.0	3.98
8/ 7/74	23.2		7.6	
8/22/74	45.8		7.2	3.14
9/ 6/74	61.1		10.5	4.19
9/18/74	153.4		16.2	
10/ 4/74	63.0	24.5	7.3	
10/16/74	36.0	15.4	5.3	2.88
10/29/74	70.5		6.8	4.29
11/14/74	80.0	31.6	7.9	3.53
11/27/74	< 4.0	8.4		< 0.10
12/18/74	66.3	56.8		3.66
1/ 6/75	51.2	22.7	3.3	4.32
1/23/75	57.5	< 5.0	2.5	3.93
2/19/75	102.1	54.7	8.0	3.40
3/ 6/75	140.1	66.3	15.7	4.60
3/21/75	66.3	35.1	5.6	3.01
4/ 4/75	96.3	33.3	6.5	2.95
4/18/75	94.5	72.2	9.0	3.11
5/ 2/75	93.9	60.2	6.6	3.15
5/16/75	86.7	56.4	5.3	3.06
5/30/75	89.4	59.5	8.4	4.19
6/11/75	77.6	63.7	4.6	3.60
6/27/75	71.8	47.3	7.3	3.73
7/ 9/75	47.0	27.0	5.8	2.97
7/25/75	76.6	27.1	7.4	3.79

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

1. C-51 Station WPB-13.5

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
6/14/74	0.960	0.902	0.058	0.14	3.17	4.13
6/14/74						
6/28/74	0.470	0.421	0.049	0.26	1.31	1.78
7/12/74	0.248	0.222	0.026	0.14	1.36	1.61
7/26/74	0.188	0.170	0.018	0.24	1.63	1.82
8/ 7/74	0.232	0.208	0.024	0.14	1.38	1.61
8/22/74	0.483	0.163	0.320	0.16	1.55	2.03
9/ 6/74	0.089	0.080	0.009	0.12	1.19	1.28
9/18/74	0.140	0.119	0.021	0.06		
10/ 4/74	0.231	0.216	0.015	0.02	1.61	1.84
10/16/74	0.165	0.150	0.015	0.06	1.30	1.47
10/29/74	0.264	0.210	0.054	0.19	1.37	1.63
11/14/74	0.132	0.128	< 0.004	0.13	1.25	1.38
11/27/74	0.088	0.083	0.005	0.09	0.44	0.53
12/18/74	0.339	0.306	0.033	0.24	1.02	1.36
1/ 6/75	0.116	0.109	0.007	0.04	0.81	0.93
1/23/75	0.407	0.390	0.017	0.07	0.73	1.14
2/19/75	0.360	0.347	0.013	0.08	1.26	1.62
3/ 6/75	1.066	0.972	0.094	0.19	1.58	2.65
3/21/75	0.104	0.082	0.022	0.11	0.97	1.07
4/ 4/75	0.282	0.275	0.007	0.03	0.88	1.16
4/19/75	0.226	0.219	0.007	0.04	1.02	1.25
5/ 2/75	0.149	0.144	0.005	0.01	1.25	1.40
5/16/75	0.012	0.008	< 0.004	0.01	0.84	0.85
5/30/75	0.617	0.570	0.047	0.21	1.83	2.45
6/11/75	0.243	0.214	0.029	0.29	1.30	1.54
6/27/75			0.045	0.35	2.04	
7/ 9/75			0.043	0.30	2.10	
7/25/75	0.312	0.269	0.043	0.64	2.20	2.51

APPENDIX D-1 (Continued)

Date Mo/Day/Yr		O-PO_4	T-PO_4	Na	K	Ca	Mg
6/14/74	<	0.002	0.044	139.00	6.20	62.60	17.10
6/14/74							
6/28/74		0.051	0.085	99.00	5.60	67.40	12.80
7/12/74		0.132	0.187	38.00	3.40	70.40	5.60
7/26/74		0.055	0.084	77.00	2.70	81.60	8.00
8/ 7/74		0.040	0.115	5.00	0.40	52.80	3.60
8/22/74		0.059	0.081	30.00	1.80	65.60	4.60
9/ 6/74		0.018	0.055	38.00	2.70	77.80	5.40
9/18/74		0.042	0.073	105.00	5.00	75.50	17.00
10/ 4/74		0.022	0.069	40.00	2.60	47.20	6.80
10/16/74		0.080	0.196	24.00	2.30	60.00	3.80
10/29/74		0.061	0.076	109.00	3.70	95.80	12.00
11/14/74		0.033	0.044	69.00	3.10	76.60	9.60
11/27/74		0.199	0.227	28.00	3.70	78.80	4.80
12/18/74		0.014	0.028	51.00	3.75	92.00	8.00
1/ 6/75		0.136	0.150	44.40	3.00	97.40	8.10
1/23/75		0.155	0.189	33.40	2.40	89.40	5.30
2/19/75		0.033	0.051	68.60	4.20	57.20	15.10
3/ 6/75		0.070	0.091	92.90	6.00	73.90	21.40
3/21/75			0.182	52.70	3.60	80.10	10.50
4/ 4/75		0.032	0.051	58.80	4.50	51.20	15.70
4/18/75		0.023	0.049	61.50	4.00	52.40	16.70
5/ 2/75		0.017	0.055	62.40	4.10	54.60	16.70
5/16/75	<	0.002	0.018	38.50	1.80	79.90	6.10
5/30/75		0.011	0.034	108.80	4.50	91.40	16.40
6/11/75		0.006	0.031	65.40	3.80	82.50	10.60
6/27/75		0.061	0.097	55.80	3.00	84.10	8.40
7/ 9/75		0.204	0.251	35.80	2.47	71.30	6.20
7/25/75		0.074	0.091	85.28	2.36	103.01	8.40

APPENDIX D-1 (Continued)

Date Mo/Day/Yr	Cl	SO_4	SiO_2	Alk
6/14/74	218.8		15.6	4.96
6/14/74				
6/28/74	157.0		12.7	4.87
7/12/74	55.6		1.4	3.20
7/26/74	117.7		9.3	4.04
8/ 7/74	25.2		7.6	
8/22/74	45.2		6.8	3.01
9/ 6/74	73.9		11.3	3.70
9/18/74	153.2		16.4	
10/ 4/74	63.4	22.2	7.3	
10/16/74	39.5	19.2	5.7	3.22
10/29/74	157.4		8.2	5.08
11/14/74	136.0	26.6	9.7	3.51
11/27/74	< 4.0	12.5		< 0.10
12/18/74	74.7	57.6		3.66
1/ 6/75	73.6	35.8	4.9	3.95
1/23/75	58.5	8.5	3.4	4.28
2/19/75	104.5	52.2	8.2	3.31
3/ 6/75	125.8	63.4	13.5	3.98
3/21/75	83.5	33.1	5.9	2.86
4/ 4/75	90.7	52.2	6.6	2.91
4/18/75	96.5	71.0	7.8	2.69
5/ 2/75	93.3	62.5	6.3	3.04
5/16/75	64.6	56.0	4.8	3.27
5/30/75	140.0	56.5	10.8	4.88
6/13/75	106.7	44.6	7.4	3.98
6/27/75	88.0	43.9	7.5	3.91
7/ 9/75	50.0	24.9	6.2	3.19
7/25/75	131.1	28.3	9.0	4.82

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

1. C-51 Station WPB-18.0

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
6/14/74	1.120	1.046	0.074	0.20	6.24	7.36
6/14/74						
6/28/74	0.364	0.321	0.043	0.28	1.50	1.86
7/12/74	0.308	0.269	0.039	0.27	2.53	2.84
7/26/74	0.067	0.058	0.009	0.27	1.77	1.84
8/ 7/74	0.240	0.215	0.025	0.20	1.38	1.62
8/22/74	0.145	0.127	0.018	0.19	2.19	2.34
8/27/74						
8/28/74	0.147	0.134	0.013	0.18		
9/ 6/74	0.048	0.040	0.008	0.20	1.60	1.65
9/18/74	0.140	0.121	0.019	0.03		
10/ 4/74	0.225	0.211	0.014	0.03	1.53	1.76
10/16/74	0.146	0.134	0.012	0.11	1.58	1.73
10/29/74	0.352	0.298	0.054	0.10	1.58	1.93
11/14/74	0.151	0.147	< 0.004	0.03	1.11	1.26
11/27/74	0.078	0.074	0.004	0.09	0.42	0.50
12/18/74	0.351	0.318	0.033	0.29	1.50	1.85
1/ 6/75	0.116	0.109	0.007	0.04	0.79	0.91
1/23/75	0.043	0.026	0.017	0.06	0.71	0.75
2/19/75	0.367	0.361	0.006	0.07	1.25	1.62
3/ 6/75	0.834	0.776	0.058	0.17	1.42	2.25
3/31/75	0.199	0.179	0.020	0.15	1.14	1.34
4/ 4/75	0.292	0.286	0.006	0.06	0.88	1.17
4/18/75	0.218	0.211	0.007	0.06	1.16	1.38
5/ 2/75	0.151	0.146	0.005	0.06	1.25	1.40
5/16/75	0.224	0.202	0.022	0.09	1.45	1.67
5/30/75	0.200	< 0.122	0.078	0.41	2.33	2.53
6/11/75	0.231	0.207	0.024	0.66	1.12	1.35
6/27/75			0.033	0.64	2.18	
7/ 9/75			0.046	0.43	2.54	
7/25/75	0.165	0.131	0.034	0.80	2.68	2.85

APPENDIX D-1 (Continued)

Date Mo/Day/Yr	O-PO_4	T-PO_4	Na	K	Ca	Mg
6/14/74	< 0.002	0.035	157.00	6.70	74.80	21.00
6/14/74						
6/28/74	0.025	0.062	72.00	3.30	80.60	12.40
7/12/74	0.155	0.209	20.00	1.90	77.20	7.40
7/26/74	0.133	0.166	48.00	2.90	66.40	6.20
8/ 7/74	0.025	0.067	30.00	2.00	64.20	4.30
8/22/74	0.075	0.101	31.00	2.00	56.20	4.80
8/27/74						
8/28/74	0.046	0.013	38.00	2.00	50.60	5.00
9/ 6/74	0.027	0.058	52.00	3.10	73.80	6.60
9/18/74	0.031	0.083	105.00	4.80	77.00	17.20
10/ 4/74	0.070	0.068	40.00	2.50	44.20	6.60
10/16/74	0.156	0.211	24.00	2.50	27.20	2.00
10/29/74	0.045	0.062	113.00	4.30	89.40	13.80
11/14/74	0.027	0.029	64.00	4.00	78.60	9.60
11/27/74	0.198	0.219				
12/18/74	0.047	0.052	68.00	3.90	56.00	8.80
1/ 6/75	0.126	0.144	30.40	2.50	104.20	4.90
1/23/75	0.154	0.197	35.00	3.00	89.40	5.20
2/19/75	0.034	0.050	64.00	4.40	52.20	15.40
3/ 6/75	0.064	0.086	81.90	5.30	63.50	19.90
3/21/75	0.046	0.056	77.00	5.60	58.00	16.00
4/ 4/75	0.032	0.051	58.60	4.70	50.50	16.00
4/18/75	0.027	0.047	61.10	4.30	51.20	16.90
5/ 2/75	0.017	0.053	63.10	4.10	53.50	17.30
5/16/75	0.046	0.072	78.50	5.10	59.70	16.20
5/30/75	0.054	0.076	129.80	5.60	95.00	19.00
6/11/75	0.124	0.124	53.90	3.20	70.30	8.00
6/27/75	0.063	0.097	70.40	2.80	93.60	8.20
7/ 9/75	0.366	0.421	47.80	3.33	70.80	6.80
7/25/75	0.068	0.093	81.68	2.57	103.52	9.01

APPENDIX D-1 (Continued)

Mo/Day/Yr	Cl	SO_4	SiO_2	Alk
6/14/74	224.4		15.9	4.96
6/14/74				
6/28/74	171.3		11.5	4.56
7/12/74	86.9		9.2	3.65
7/26/74	72.1		8.7	3.48
8/ 7/74	41.1		8.0	
8/22/74	47.4		6.3	2.59
8/27/74				
8/28/74	51.2		7.6	2.75
9/ 6/74	83.5		10.1	3.44
9/18/74	150.8		18.5	
10/ 4/74	61.8	20.9	8.5	
10/16/74	35.2	17.9	5.4	2.96
10/29/74	162.4		9.9	5.02
11/14/74	124.3	22.9	8.5	3.45
11/27/74	43.0	12.7		4.04
12/18/74	107.3	48.2		3.89
1/ 6/75	67.7	34.8	4.8	4.10
1/23/75	59.5	20.0	3.3	4.49
2/19/75	96.7	54.7	7.9	3.08
3/ 6/75	116.0	61.4	11.9	3.50
3/31/75	102.1	54.4	8.5	2.30
4/ 4/75	96.5	52.2	6.6	2.86
4/18/75	90.2	73.5	7.3	2.71
5/ 2/75	94.3	58.7	6.3	3.00
5/16/75	116.2	56.9	5.4	3.40
5/30/75	187.2	62.0	11.4	5.19
6/11/75	84.0	27.7	8.7	3.30
6/27/75	110.6	36.3	9.6	4.45
7/ 8/75	78.6	18.4	6.3	3.36
7/25/75	147.2	28.3	8.8	4.93

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

1. C-51 Station WPB-22.0

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
6/14/74	2.800	2.580	0.220	1.01	11.10	13.90
6/14/74						
6/28/74	0.226	0.212	0.014	0.14	0.98	1.21
7/12/74	0.748	0.717	0.031	0.03	1.31	2.06
7/26/74	0.074	0.065	0.009	0.10	1.61	1.68
8/ 7/74	0.264	0.249	0.015	0.04	1.37	1.63
8/22/74	0.157	0.148	0.009	0.10	1.66	1.82
9/ 6/74	0.016	0.012	< 0.004	0.03	1.60	1.62
9/18/74	0.090	0.071	0.019	0.03		
10/ 4/74	0.231	0.216	0.015	0.03	1.50	1.73
10/16/74	0.088	0.078	0.010	0.06	1.19	1.28
10/29/74	0.330	0.303	0.027	0.06	1.18	1.51
10/29/74						
11/14/74	0.270	0.266	< 0.004	0.06	1.34	1.61
11/27/74	0.101	0.097	0.004	0.09	0.65	0.75
12/18/74	3.537	3.517	0.020	0.11	2.35	5.89
1/ 6/75	< 0.003	< 0.004	< 0.004	0.05	0.69	0.69
1/23/75	0.080	0.063	0.017	0.07	0.57	0.65
2/10/75	0.371	0.349	0.022	0.08	1.23	1.60
3/ 6/75	0.909	0.840	0.069	0.19	1.58	2.49
3/21/75			0.023	0.11	1.24	
4/ 4/75	0.289	0.284	0.005	0.10	1.33	1.62
4/18/75	0.203	0.197	0.006	0.02	1.14	1.34
5/ 2/75	0.103	0.099	< 0.004	< 0.01	1.28	1.38
5/16/75	0.245	0.213	0.032	0.31	1.75	2.00
5/30/75	2.628	2.220	0.408	0.29	2.47	5.10
6/11/75	0.240	0.223	0.017	0.10	1.17	1.41
6/27/75			0.017	0.15	1.68	
7/ 9/75			0.012	0.13	1.84	
7/25/75	0.265	0.250	0.015	0.10	1.25	1.52

APPENDIX D-1 (Continued)

Date Mo/Day/Yr	O-PO_4	T-PO_4	Na	K	Ca	Mg
6/14/74	0.092	0.104	193.00	8.80	63.40	24.60
6/14/74						
6/28/74	0.055	0.080	64.00	3.90	51.40	10.60
7/12/74	0.048	0.108	22.00	3.10	63.40	6.80
7/26/74	0.056	0.072	31.00	2.10	41.00	4.40
8/ 7/74	0.060	0.089	19.00	1.50	38.40	3.40
8/22/74	0.032	0.055	22.00	1.50	43.40	4.20
9/ 6/74	0.016	0.025	57.00	2.30	56.00	8.80
9/18/74	0.036	0.090	105.00	4.80	72.50	17.20
10/ 4/74	0.045	0.069	41.00	2.40	46.00	6.60
10/16/74	0.204	0.175	26.00	2.30	58.40	3.80
10/29/74	0.042	0.054	78.00	4.70	54.60	16.80
10/29/74						
11/14/74	0.036	0.052	51.00	3.20	34.40	14.00
11/27/74	0.170	0.224	26.00	4.00	82.20	4.40
12/18/74	0.186	0.319	69.00	4.80	69.20	11.00
1/ 6/75	0.202	0.211	30.60	2.50	103.60	4.80
1/23/75	0.131	0.149	29.10	2.50	84.80	4.60
2/19/75	0.032	0.050	69.40	5.10	48.20	15.60
3/ 6/75	0.064	0.089	77.90	5.50	63.10	21.10
3/21/75	0.048	0.063	73.60	4.60	59.80	17.80
4/ 4/75	0.033	0.051	69.90	5.20	49.80	17.00
4/18/75	0.028	0.049	59.70	4.30	48.80	17.30
5/ 2/75	0.014	0.038	57.80	4.10	49.60	17.10
5/16/75	0.052	0.071	74.00	5.00	49.90	17.70
5/30/75	0.031	0.051	185.40	7.70	93.40	30.80
6/11/75	0.017	0.042	32.00	2.10	46.20	5.30
6/27/75	0.080	0.101	27.40	2.70	45.70	5.40
7/ 9/75	0.301	0.343	28.00	2.48	42.60	5.60
7/25/75	0.020	0.048	35.35	1.37	54.20	5.09

APPENDIX D-1 (Continued)

Date Mo/Day/Yr	Cl	SO_4	SiO_2	Alk
6/14/74	281.2		25.7	6.69
6/14/74				
6/28/74	127.7		10.3	3.80
7/12/74	63.6		8.1	3.13
7/26/74	39.7		6.8	2.34
8/ 7/74	16.3		5.0	
8/22/74	32.1		5.2	1.88
9/ 6/74	84.9		11.1	3.18
9/18/74	152.6		16.2	
10/ 4/74	62.8	26.1	7.3	
10/16/74	28.3	11.6	4.1	2.20
10/29/74	110.9		9.4	3.32
10/29/74				
11/14/74	99.6	29.1	7.0	1.77
11/27/74	50.0	14.4		4.04
12/18/74	97.9	40.8		3.23
1/ 6/75	48.6	22.7	3.2	4.38
1/23/75	50.3	23.5	3.8	4.51
2/10/75	96.1	56.2	8.2	2.93
3/ 6/75	110.9	62.1	12.8	3.50
3/21/75	105.5	54.4	8.9	2.30
4/ 4/75	107.6	58.4	7.3	2.94
4/18/75	88.6	71.5	7.4	2.65
5/ 2/75	87.4	61.3	5.5	2.77
5/16/75	105.0	61.2	6.4	3.11
5/30/75	242.5	83.5	19.3	6.46
6/11/75	49.0	24.4	5.6	2.08
6/27/75	44.4	25.3	6.3	2.13
7/ 9/75	45.8	7.9	5.6	2.28
7/25/75	48.8	17.1	6.1	2.67

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

2. Hillsboro Canal Station HBC-00.0

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
4/11/74	0.013	0.009	< 0.004	0.09	1.65	1.66
4/28/74	0.135	0.117	0.018	0.07	0.93	1.06
7/12/74	0.121	0.109	0.012	0.06	3.05	3.17
8/ 7/74	0.089	0.075	0.014	0.18	1.40	1.49
8/20/74	0.093	0.085	0.008		1.77	1.86
9/ 6/74	0.039	0.030	0.009	0.19	1.39	1.43
9/18/74	0.065	0.060	0.005	0.17		
10/ 4/74	0.048	0.038	0.010	0.09	1.63	1.68
10/16/74	0.055	0.038	0.017	0.21	1.71	1.77
10/29/74						
11/14/74	0.261	0.257	< 0.004	0.02	0.66	0.92
11/27/74			0.016	0.20	1.02	
12/18/74	0.184	0.169	0.015	0.12	1.11	1.29
1/ 6/75	0.059	0.050	0.009	0.09	1.27	1.33
1/23/75	0.077	0.055	0.022	0.11	1.21	1.29
2/19/75	0.022	< 0.004	0.018	0.01	1.21	1.23
3/ 6/75			0.006	0.02	1.17	
3/20/75	0.017	0.006	0.011	0.09	1.01	1.03
4/ 3/75	< 0.003	< 0.004	< 0.004	< 0.01	1.00	1.00
4/17/75	< 0.003	< 0.004	< 0.004	< 0.01	0.91	0.91
5/ 1/75	< 0.003	< 0.004	< 0.004	< 0.01	1.81	1.81
5/15/75	0.132	0.112	0.020	0.12	2.09	2.22
5/29/75	0.041	0.037	0.004	0.07	1.45	1.49
6/ 9/75						
6/13/75	0.057	0.046	0.011	0.12	1.50	1.56
6/26/75			0.009	0.03	1.44	
7/11/75			0.028	0.19	1.78	
7/24/75	0.089	0.083	0.006	0.19	1.61	1.70

APPENDIX D-2 (Continued)

Date Mo/Day/Yr	O-PO_4	T-PO_4	Na	K	Ca	Mg
6/11/74	0.004	0.021	72.00	3.10	74.50	9.20
6/28/74	0.009	0.042	17.00	1.20	53.40	4.20
7/12/74	0.021	0.057	31.00	3.00	55.40	4.60
8/ 7/74	0.176	0.215	46.00	4.70	90.00	7.50
8/20/74		0.259	46.00	6.40	88.40	8.00
9/ 6/74	0.072	0.084	53.00	3.70	89.40	8.00
9/18/74	0.064	0.108	53.00	3.70	80.50	4.50
10/ 4/74	0.258	0.305	54.00	4.90	87.80	7.80
10/16/74	0.011	0.341	40.00	5.60	70.00	6.40
11/20/74						
11/14/74	0.025	0.037	20.00	5.60	64.40	3.80
11/27/74	0.130	0.154	54.00	4.80	91.60	7.20
12/18/74	0.244	0.202	50.00	5.45	94.80	7.90
1/ 6/75	0.043	0.061	85.00	5.40	97.20	15.40
1/23/75	0.029	0.048	79.30	4.80	89.60	12.90
2/19/75	0.019	0.033	72.60	4.40	89.40	12.40
3/ 6/75	0.022	0.039	71.50	4.20	93.10	12.40
3/20/75	0.028	0.040	83.60	5.40	94.10	14.20
4/ 3/75	0.006	0.037	78.10	4.60	92.20	13.60
4/17/75	< 0.002	0.019	88.90	4.40	87.20	16.00
5/ 1/75	< 0.002	0.022	91.50	4.70	84.20	17.10
5/15/75	0.039	0.064	95.00	5.20	76.90	15.30
5/29/75	0.030	0.061	66.60	4.40	91.70	10.60
5/29/75						
6/13/75	0.166	0.174	68.40	5.30	99.40	10.60
6/26/75	0.121	0.229	52.50	5.20	84.30	8.60
7/11/75	0.295	0.316	61.80	6.70	85.60	10.50
7/24/75	0.143	0.154	68.96	3.63	103.52	9.59

APPENDIX D-2 (Continued)

Date Mo/Day/Yr	Cl	SO_4	SiO_2	Alk
6/11/74	105.6		9.6	4.60
6/28/74	78.0		8.4	4.64
7/12/74	71.6		8.6	4.57
8/ 7/74	77.1		9.7	
8/20/74	68.1		9.0	4.49
9/ 6/74	81.3		10.5	4.92
9/18/74	79.6		9.8	
10/ 4/74	86.8	15.8	10.8	
10/16/74	59.4	15.4	7.8	4.20
10/29/74				
11/14/74	39.7	27.9	5.5	2.65
11/27/74	88.1	19.3		4.82
12/18/74	69.1	26.5		4.27
1/ 6/75	122.3	37.9	7.9	4.75
1/23/75	116.2	31.7	7.8	5.03
2/19/75	106.7	32.1	5.6	4.97
3/ 6/75	102.9	39.8	6.0	4.91
3/20/75	96.5	32.9	7.4	3.40
4/ 3/75	117.9	36.4	6.5	5.21
4/17/75	124.4	42.2	2.6	4.94
5/ 1/75	133.7	39.9	4.5	5.09
5/15/75	143.5	26.7	9.4	4.71
5/29/75	98.5	39.0	7.5	4.75
6/29/75				
6/13/75	109.1	37.8	9.7	5.15
6/26/75	79.8	31.9	7.9	4.20
7/11/75	93.4	23.8	8.5	4.78
7/24/75	100.1	25.1	9.1	5.07

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

2. Hillsboro Canal Station HBC-01.0

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
6/11/74	0.053	0.043	0.010	0.12	1.40	1.45
6/28/74	0.081	0.066	0.015	0.17	1.15	1.23
7/12/74	0.055	0.042	0.013	0.09	1.81	1.87
8/ 7/74	0.051	0.040	0.011	0.18	1.71	1.76
8/20/74	0.016	0.011	0.005	0.27	2.19	2.21
9/ 6/74	0.069	0.061	0.008	0.24	1.81	1.88
9/18/74	0.021	0.017	< 0.004	0.29		
10/ 4/74	0.023	0.013	0.010	0.09	1.53	1.55
10/16/74	0.072	0.056	0.016	0.24	1.80	1.87
10/29/74	0.076	0.067	0.009	0.09	1.23	1.31
11/14/74	0.134	0.130	< 0.004	< 0.01	0.69	0.82
11/27/74	0.145	0.129	0.016	0.17	0.50	0.65
12/18/74	0.210	0.191	0.019	0.14	0.98	1.19
1/ 6/75	0.051	0.043	0.008	0.09	1.31	1.36
1/23/75	0.084	0.062	0.022	0.14	1.06	1.14
2/19/75	0.023	< 0.004	0.019	< 0.01	1.12	1.14
3/ 6/75	0.070	0.066	< 0.004	0.06	1.10	1.17
3/20/75	0.070	0.054	0.016	0.09	1.18	1.25
4/ 3/75	< 0.003	< 0.004	< 0.004	0.03	1.07	1.07
4/17/75	< 0.003	< 0.004	< 0.004	< 0.01	1.80	1.80
5/ 1/75	0.028	0.024	< 0.004	0.03	1.77	1.80
5/15/75	0.099	0.082	0.017	0.10	1.89	1.99
5/29/75	0.018	0.014	< 0.004	0.10	1.45	1.47
6/13/75	0.048	0.038	0.010	0.16	1.51	1.56
6/26/75			0.009	0.04	1.33	
7/11/75			0.028	0.23	1.85	
7/24/75	0.044	0.037	0.007	0.22	1.71	1.75

APPENDIX D-2 (Continued)

Date Mo/Day/Yr	O-PO_4	T-PO_4	Na	K	Ca	Mg
6/11/74	0.003	0.021	82.00	4.10	72.80	9.80
6/28/74	0.020	0.042	55.00	2.70	42.60	4.40
7/12/74	0.056	0.080	42.00	3.30	93.80	9.20
7/ 7/74	0.180	0.228	53.00	5.20	90.00	8.00
7/30/74	0.200	0.274	55.00	6.30	95.00	9.20
8/ 6/74	0.123	0.134	58.00	4.30	92.20	8.80
8/18/74	0.036	0.092	68.00	4.10	110.50	9.20
10/ 4/74	0.261	0.304	55.00	5.00	90.80	7.80
10/16/74	0.300	0.357	29.00	4.10	68.40	6.40
10/29/74	0.082	0.102	52.00	3.80	91.80	7.00
11/14/74	0.015	0.026	25.00	6.20	60.20	3.80
11/27/74	0.120	0.157	56.00	5.10	88.80	7.80
12/18/74	0.210	0.188	52.00	5.35	94.80	8.20
1/ 6/75	0.042	0.058	86.60	5.30	95.80	15.20
1/23/75	0.033	0.051	76.60	4.50	92.00	12.60
2/19/75	0.017	0.038	61.00	4.40	89.20	9.20
3/ 6/75	0.015	0.034	67.70	3.90	96.80	11.80
3/20/75	0.029	0.052	67.10	4.00	99.40	11.70
4/ 3/75	0.006	0.034	78.40	4.50	91.50	13.70
4/17/75	< 0.002	0.021	93.50	4.50	83.60	17.70
5/ 1/75	0.002	0.027	90.40	4.50	85.70	16.50
5/15/75	0.026	0.055	88.70	4.90	79.90	13.60
5/29/75	0.028	0.058	67.60	4.60	96.40	10.70
6/13/75	0.160	0.171	69.10	5.30	100.50	11.20
6/26/75	0.192	0.206	53.80	5.10	86.00	8.40
7/11/75	0.301	0.321	58.90	6.53	85.60	9.90
7/24/75	0.088	0.137	68.96	3.65	102.33	9.56

APPENDIX D-2 (Continued)

Date Mo/Day/Yr	Cl	SO_4	SiO_2	Alk
6/11/74	123.0		10.2	4.86
6/28/74	114.9		9.9	4.95
7/12/74	106.4		10.0	4.76
8/ 7/74	84.6		9.8	
8/20/74	81.0		10.3	4.73
9/ 6/74	86.7		10.6	5.01
9/18/74	103.7		11.5	
10/ 4/74	80.6	145.0	10.8	
10/16/74	67.9	12.9	8.3	4.34
10/29/74	65.1		7.3	5.02
11/14/74	46.2	29.1	5.3	2.69
11/27/74	174.6	12.5		2.32
12/18/74	74.7	27.5		4.42
1/ 6/75	121.3	37.6	7.8	4.73
1/23/75	126.4	32.2	7.9	4.71
2/19/75	84.2	25.8	5.7	4.85
3/ 6/75	98.0	40.7	7.3	4.96
3/20/75	118.5	40.2	7.8	3.42
4/ 3/75	123.9	34.5	6.9	5.42
4/17/75	133.3	41.7	5.4	4.94
5/ 1/75	131.0	51.2	7.0	5.01
5/15/75	132.8	25.7	9.0	4.74
5/29/75	98.7	40.0	7.5	4.91
6/13/75	108.9	37.0	9.9	5.22
6/26/75	83.4	33.0	8.2	4.50
7/11/75	51.0	25.7	8.4	4.83
7/24/75	67.8	26.3	9.2	5.05

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

2. Hillsboro Canal Station HBC-04.2

Date Mo/Day/Yr	O-PO_4	T-PO_4	Na	K	Ca	Mg
6/11/74	0.039	0.031	0.008	0.20	1.83	1.87
6/28/74	0.017	0.013	< 0.004	0.32	0.78	0.80
7/12/74	< 0.003	< 0.004	< 0.004	< 0.01	1.70	1.70
8/ 7/74	0.023	0.013	0.010	0.20	2.75	2.77
8/20/74	0.071	0.064	0.007	0.30	2.68	2.75
9/ 6/74	< 0.003	< 0.008	< 0.004	0.05	0.88	0.88
9/18/74	0.021	0.017	< 0.004	0.30		
10/ 4/74	0.025	0.015	0.010	0.05	1.53	1.56
10/16/74	0.043	0.027	0.016	0.23	0.95	0.99
10/29/74	0.058	0.054	< 0.004	0.07	1.21	1.27
11/14/74	0.052	0.048	< 0.004	0.23	1.38	1.43
11/27/74	0.149	0.126	0.023	0.26	1.29	1.44
12/18/74	0.473	0.449	0.024	0.23	1.09	1.56
1/ 5/75	0.082	0.074	0.008	0.12	1.32	1.40
1/23/75	0.083	0.061	0.022	0.11	1.26	1.34
2/19/75	0.063	0.043	0.020	0.04	1.46	1.52
3/ 6/75	0.069	0.061	0.008	0.08	1.40	1.47
3/20/75	0.021	0.009	0.012	0.08	0.89	0.91
4/ 3/75	0.036	0.032	< 0.004	0.06	1.29	1.33
4/17/75	0.030	0.023	0.007	0.05	2.29	2.32
5/ 1/75	0.019	0.015	< 0.004	0.01	2.08	2.10
5/15/75	0.109	0.092	0.017	0.13	2.04	2.15
5/29/75	0.025	0.021	< 0.004	0.08	1.64	1.67
6/13/75	0.008	0.004	0.004	0.03	1.21	1.22
6/26/75			0.024	0.13	1.92	
7/11/75			0.035	0.29	2.12	
7/24/75	0.070	0.064	0.006	0.24	2.06	2.13

APPENDIX D-2 (Continued)

Date Mo/Day/Yr	O-PO_4	T-PO_4	Na	K	Ca	Mg
6/11/74	< 0.002	0.016	94.00	3.80	74.60	11.80
6/28/74	0.036	0.068	28.00	2.50	60.00	2.80
7/12/74	0.022	0.071	11.00	1.40	83.40	4.60
8/ 7/74	0.181	0.228	57.00	4.90	92.80	8.40
8/20/74	0.240	0.298	61.00	6.70	91.60	9.60
9/ 6/74	0.154	0.181	24.00	3.40	91.20	4.00
9/18/74	0.032	0.142	68.00	4.10	107.00	9.00
10/ 4/74	0.301	0.298	55.00	5.00	86.60	7.80
10/16/74	0.328	0.382	41.00	5.30	71.60	6.80
10/29/74	0.208	0.069	35.00	4.80	86.60	5.60
11/14/74	0.085	0.093	51.00	4.10	92.20	7.40
11/27/74	0.172	0.185	61.00	5.50	86.60	8.20
12/18/74	0.223	0.169	58.00	5.55	100.00	8.60
1/ 5/75	0.036	0.062	85.60	5.30	94.40	15.60
1/23/75	0.031	0.056	73.10	4.50	83.00	11.80
2/15/75	0.032	0.054	77.80	4.70	87.60	12.80
3/ 6/75	0.025	0.044	93.10	5.10	90.60	17.00
3/20/75	0.028	0.043	69.60	4.10	101.60	12.20
4/ 3/75	0.009	0.031	102.00	5.20	79.80	19.10
4/17/75	0.003	0.024	108.10	4.50	68.40	21.00
5/ 1/75	0.004	0.032	99.30	3.90	69.80	18.40
5/15/75	0.026	0.058	92.20	4.80	77.20	14.60
5/29/75	0.028	0.056	76.20	4.40	88.10	11.90
6/13/75	0.233	0.237	51.60	6.20	81.80	9.80
6/26/75	0.179	0.268	61.80	5.90	87.70	10.10
7/11/75	0.193	0.196	68.90	4.93	91.60	10.80
7/24/75	0.095	0.128	79.36	3.84	102.50	11.04

APPENDIX D-2 (Continued)

Mo/Day/Yr	Cl	SO_4	SiO_2	Alk
6/11/74	146.5		11.9	5.10
6/28/74	43.2		5.5	4.58
7/12/74	50.8		1.4	4.46
8/ 7/74	86.5		10.4	
8/20/74	90.7		11.1	4.79
9/ 6/74	39.0		6.2	4.55
9/18/74	103.9		11.6	
10/ 4/74	88.6	14.8	12.2	
10/16/74	65.9	15.4	8.2	4.32
10/25/74	48.3		5.3	4.39
11/14/74	104.8	21.6	7.8	3.57
11/27/74	99.1	11.1		4.82
12/18/74	84.1	28.5		4.76
1/ 5/75	126.7	34.1	9.6	4.36
1/23/75	114.4	32.2	7.7	5.05
2/10/75	115.1	26.8	6.9	4.92
3/ 6/75	128.4	44.5	9.3	5.06
3/20/75	96.9	49.3	7.4	3.42
4/ 3/75	144.8	31.3	11.0	5.40
4/17/75	155.8	35.2	12.1	4.76
5/ 1/75	144.0	29.9	7.0	4.74
5/15/75	138.5	22.6	8.9	4.75
5/29/75	114.0	29.3	7.4	4.78
6/13/75	82.2	40.6	4.8	4.00
6/26/75	87.6	33.5	8.9	4.57
7/11/75	104.1	20.2	9.6	4.96
7/24/75	114.3	23.3	10.0	4.30

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

3. North New River Station 00.0

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
6/11/74	0.269	0.248	0.021	0.09	1.83	2.10
6/28/74	0.131	0.123	0.008	0.34	1.59	1.63
7/12/74	0.127	0.118	0.009	0.30	2.09	2.22
8/30/74	0.113	0.099	0.014		2.14	2.25
9/ 5/74	0.330	0.312	0.018	0.34	1.69	2.02
9/17/74	0.195	0.161	0.034	0.40		
10/ 3/74	0.131	0.121	0.010	0.11	1.49	1.62
10/17/74	0.024	0.015	0.008	0.08	2.03	2.05
10/29/74	0.183	0.146	0.037	0.18	2.08	2.24
11/13/74	0.295	0.291	< 0.004	0.05	1.47	1.77
11/26/74				0.45	1.18	
12/10/74	0.585	0.526	0.059	0.11	1.15	1.74
1/ 5/75	0.016	0.010	0.006	0.66	1.86	1.88
1/22/75	0.099	0.077	0.022	0.47	1.94	2.04
2/18/75	0.242	0.223	0.019	0.01	1.46	1.70
3/ 5/75	0.118	0.114	< 0.004	< 0.01	1.70	1.82
3/20/75	0.043	0.030	0.013	0.09	1.73	1.77
4/ 3/75	0.028	0.024	< 0.004	0.01	1.72	1.75
4/17/75	0.017	0.012	0.005	< 0.01	2.34	2.36
5/ 1/75	< 0.003	< 0.004	< 0.004	0.08	2.59	2.59
5/15/75	0.094	0.082	0.012	0.26	2.33	2.42
5/29/75	0.068	0.064	0.004	0.03	1.80	1.87
6/13/75	0.320	0.298	0.022	0.06	1.45	1.77
6/26/75			0.056	0.38	2.00	
7/11/75			0.067	0.21	1.74	
7/24/75	0.061	0.036	0.025	0.18	2.06	2.92

APPENDIX D-3 (Continued)

Date Mo/Day/Yr		O-PO_4		T-PO_4	Na	K	Ca	Mg
6/11/74	<	0.002		0.020	73.00	4.40	59.60	15.00
6/28/74	<	0.002		0.011	53.00	2.20	58.60	8.40
7/12/74	<	0.002		0.005	51.00	2.30	65.60	8.40
8/20/74	<	0.002		0.006	44.00	1.40	85.60	9.40
9/ 5/74		0.009		0.013	53.00	1.20	81.20	11.00
9/17/74	<	0.002		0.010	52.00	1.80	87.00	10.00
10/ 3/74		0.002		0.007	42.00	1.70	75.20	8.20
10/17/74	<	0.002		0.010	43.00	1.90	71.20	8.80
10/29/74		0.003		0.010	46.00	1.80	79.20	8.60
11/13/74		0.003		0.011	51.00	1.80	73.20	9.80
11/26/74		0.002		0.007	59.00	1.80	83.40	11.00
12/18/74	<	0.002	<	0.002	54.00	1.95	88.60	10.00
1/ 5/75	<	0.002		0.010	77.80	2.10	107.60	15.20
1/22/75		0.004		0.014	67.40	1.90	88.00	13.20
2/18/75	<	0.004		0.014	71.50	2.60	82.60	12.60
3/ 5/75	<	0.002		0.012	105.20	4.40	81.00	22.60
3/20/75		0.005		0.013	107.00	4.90	76.60	25.50
4/ 3/75	<	0.002		0.012	124.90	5.40	72.30	28.00
4/17/75	<	0.002		0.008	135.50	6.60	71.20	29.40
5/ 1/75	<	0.002		0.012	143.70	6.50	68.00	30.00
5/15/75		0.008		0.021	99.20	4.70	69.40	18.60
5/29/75	<	0.010		0.023	71.80	2.20	91.40	14.00
6/13/75	<	0.010	<	0.010	60.50	1.60	88.60	12.20
6/26/75	<	0.010		0.046	55.90	1.20	80.00	10.70
7/11/75		0.015		0.019	63.20	1.68	85.10	12.60
7/24/75		0.012		0.029	58.08	1.67	88.33	11.01

APPENDIX D-3 (Continued)

Date Mo/Day/Yr	Cl		SO_4	SiO_2	Alk
6/11/74	100.6			8.4	4.23
6/28/74	81.5			8.9	4.84
7/12/74	74.5			8.7	4.72
8/20/74	74.1			8.5	4.86
9/ 5/74	78.7			9.6	2.69
9/17/74	75.0			9.3	
10/ 3/74	64.0	<	5.0	8.2	
10/17/74	68.5	<	5.0	8.0	4.51
10/29/74	63.4			5.7	4.75
11/13/74	100.9	<	5.0	7.0	3.59
11/26/74	114.5	<	5.0		4.68
12/18/74	74.7	<	5.0		4.67
1/ 5/75	127.2	<	5.0	10.1	5.33
1/22/75	103.3	<	5.0	8.2	9.65
2/18/75	107.1	<	5.0	3.9	5.08
3/ 5/75	140.7		23.0	11.3	7.17
3/20/75	166.6		38.2	11.8	3.50
4/ 3/75	186.4		25.9	17.1	5.70
4/17/75	194.9		33.4	18.5	5.63
5/ 1/75	198.9		19.8	9.4	5.78
5/15/75	150.5		5.5	12.8	5.24
5/29/75	106.5	<	5.0	8.0	4.70
6/13/75	93.1	<	5.0	8.2	
6/26/75	83.0		7.2	9.1	5.12
7/11/75	92.8	<	5.0	8.2	5.11
7/24/75	83.3		7.1	7.8	4.96

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

3. North New River Station NNR-05.8

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
5/11/74	0.163	0.150	0.013	0.08	1.89	2.05
6/28/74	0.054	0.049	0.005	0.43	1.34	1.39
7/12/74	0.023	0.016	0.007	0.32	1.33	1.35
8/ 6/74	0.074	0.065	0.009	0.45		
8/20/74		0.062		0.01	2.44	
9/ 5/74	0.087	0.077	0.010	0.42	2.01	2.10
9/17/74	0.039	< 0.004	0.035	0.40		
10/ 3/74	0.128	0.118	0.010	0.10	1.51	1.64
10/17/74	0.324	0.317	0.007	1.17	0.18	0.50
10/29/74	< 0.003	< 0.004	< 0.004	0.31	2.54	2.54
11/13/74	< 0.003	< 0.004	< 0.004	0.62	2.19	2.19
11/26/74	0.070	0.062	0.008	0.60	1.82	1.89
12/18/74	0.393	0.361	0.032	0.52	1.61	2.00
1/ 5/75	0.013	0.007	0.006	0.71	1.91	1.92
1/22/75	0.140	0.118	0.022	0.44	1.84	1.98
2/18/75	0.078	0.056	0.022	0.52	2.03	2.11
3/ 5/75	0.041	0.035	0.006	0.10	1.97	2.01
3/20/75	0.034	0.021	0.013	0.08	1.86	1.89
4/ 3/75	0.032	0.028	< 0.004	0.13	1.77	1.80
4/17/75	0.016	0.011	0.005	< 0.01	2.39	2.41
5/ 1/75	0.028	0.024	< 0.004	0.04	2.96	2.99
5/15/75	1.184	0.175	0.009	0.26	2.28	2.46
5/29/75	0.144	0.134	0.010	0.17	1.94	2.08
6/13/75	0.083	0.077	0.006	0.49	1.89	1.97
6/26/75			0.005	0.49	2.23	
7/11/75			< 0.004	0.53	2.15	
7/24/75	0.281	0.277	< 0.004	0.51	2.19	2.47

APPENDIX D-3 (Continued)

Date Mo/Day/Yr		O-PO_4		T-PO_4	Na	K	Ca	Mg
6/11/74		0.002		0.025	74.00	4.00	60.60	16.40
6/28/74	<	0.002		0.013	32.00	1.30	62.60	9.40
7/12/74	<	0.002		0.007	53.00	2.30	82.80	11.40
8/ 6/74	<	0.002		0.015	45.00	1.60	80.00	9.60
8/26/74	<	0.002		0.005	53.00	1.90	84.20	11.00
9/ 5/74		0.011		0.009	51.00	1.20	81.60	11.00
9/17/74		0.005		0.017	51.00	1.80	84.00	9.50
10/ 3/74		0.010		0.006	40.00	1.70	75.20	8.20
10/17/74		0.011		0.052	27.00	1.10	60.60	7.40
10/29/74	<	0.002		0.003	48.00	1.80	80.00	9.60
11/13/74	<	0.002		0.008	63.00	2.10	72.60	11.40
11/26/74		0.003		0.008	59.00	1.70	85.00	11.00
12/18/74		0.003	<	0.002	57.00	1.75	96.00	11.60
1/ 5/75	<	0.002		0.008	76.60	2.00	108.20	14.90
1/22/75	<	0.002		0.013	67.20	1.90	88.00	13.30
2/18/75	<	0.004		0.012	75.70	2.20	93.80	14.80
3/ 5/75	<	0.002		0.010	118.40	5.70	76.00	27.00
3/20/75		0.005		0.013	112.00	4.90	76.90	25.50
4/ 3/75	<	0.002		0.012	116.10	5.90	71.90	25.80
4/17/75	<	0.002		0.010	132.00	6.20	69.10	28.90
5/ 1/75	<	0.002		0.018	159.70	7.60	70.20	32.20
5/15/75		0.004		0.079	71.50	3.00	72.80	13.90
5/20/75	<	0.010		0.011	65.90	1.80	92.40	13.60
6/13/75	<	0.002		0.010	65.40	1.80	94.40	12.20
6/26/75		0.004		0.023	66.20	2.00	84.50	13.10
7/11/75		0.003		0.008	66.30	1.81	86.70	13.40
7/24/75		0.003		0.024	65.28	1.86	91.75	12.91

APPENDIX D-3 (Continued)

Date Mo/Day/Yr	Cl		SO_4	SiO_2	Alk
6/11/74	115.0			8.5	4.77
6/28/74	75.8			9.0	4.56
7/12/74	80.1			9.0	4.84
8/ 6/74	62.4			9.0	
8/20/74	75.9			9.4	4.92
9/ 5/74	78.7			10.0	5.11
9/17/74	75.4			9.0	
10/ 3/74	63.2	<	5.0	9.4	
10/17/74	60.8	<	5.0	8.0	4.87
10/30/74	73.5			6.2	4.44
11/13/74	117.8	<	5.0	9.3	4.16
11/26/74	96.1	<	5.0		5.87
12/18/74	87.3	<	5.0		5.07
1/ 5/75	117.3	<	5.0	9.0	5.74
1/22/75	110.6	<	5.0	8.2	5.17
2/18/75	117.1	<	5.0	9.6	6.16
3/ 5/75	166.6		25.6	16.1	6.07
3/20/75	164.3		37.2	11.7	3.48
4/ 3/75	162.6		13.0	17.0	5.87
4/17/75	189.9		29.9	19.3	5.94
5/ 1/75	238.5		25.6	18.9	6.06
5/15/75	113.6	<	5.0	10.1	4.61
5/29/75	94.5	<	5.0	8.6	6.03
6/13/75	92.9	<	5.0	9.4	5.03
6/26/75	110.0		8.2	10.3	5.37
7/11/75	95.5	<	5.0	8.7	5.19
7/24/75	92.7	<	5.0	8.9	4.41

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

3. North New River Station NNR-09.0

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
4/11/74	0.031	0.024	0.007	0.10	2.28	2.31
6/28/74	0.029	0.025	< 0.004	0.39	1.53	1.56
7/12/74	0.057	0.050	0.007	0.26	1.27	1.33
8/ 6/74	0.109	0.102	0.007	0.51		
8/20/74	0.223	0.206	0.017		2.52	2.74
9/ 5/74	0.107	0.099	0.008	0.61	2.09	2.20
9/17/74	0.203	0.170	0.033	0.42		
10/ 3/74	0.125	0.114	0.011	0.10	1.46	1.59
10/17/74	0.036	0.028	0.008	1.16	2.36	2.40
10/29/74	< 0.003	< 0.004	< 0.004	0.33	2.65	2.65
11/13/74	0.026	0.022	< 0.004	0.59	2.24	2.27
11/26/74	0.078	0.069	0.009	0.45	1.91	1.99
12/18/74	0.117	0.110	0.007	0.56	1.72	1.84
1/ 5/75	0.013	0.005	0.008	0.72	1.98	1.99
1/22/75	0.255	0.233	0.022	0.09	1.92	2.18
2/18/75	0.033	0.016	0.017	0.60	1.95	1.98
3/ 5/75	0.020	0.016	0.004	0.13	1.97	1.99
3/20/75	0.035	0.022	0.013	0.14	1.82	1.86
4/ 3/75	0.026	0.022	< 0.004	0.07	1.81	1.84
4/17/75	0.011	0.007	< 0.004	0.04	2.39	2.40
5/ 1/75	0.014	0.010	< 0.004	< 0.01	2.79	2.80
5/15/75	0.157	0.149	0.008	0.31	2.32	2.48
5/29/75	0.036	0.031	0.005	0.27	1.99	2.03
6/13/75	0.142	0.135	0.007	0.51	1.94	2.08
6/26/75			0.005	0.57	2.14	
7/11/75			< 0.004	0.53	2.17	
7/24/75	0.026	0.017	0.009	0.55	2.20	2.23

APPENDIX D-3 (Continued)

Date Mo/Day/Yr	O-PO_4	T-PO_4	Na	K	Ca	Mg
4/11/74	< 0.002	0.018	52.00	2.90	59.60	11.00
4/28/74	< 0.002	0.021	37.00	1.20	60.00	8.20
7/12/74	< 0.002	0.007	67.00	2.40	84.80	13.00
8/ 6/74	< 0.002	0.019	41.00	1.20	80.00	9.00
8/20/74	< 0.002	0.006	50.00	1.40	89.80	10.60
9/ 5/74	0.009	0.010	52.00	1.30	39.40	5.40
9/17/74	0.005	0.013	51.00	1.70	78.50	9.00
10/ 3/74	< 0.002	0.005	41.00	1.80	75.80	8.00
10/17/74	< 0.002	0.005	44.00	2.00	69.40	8.60
10/29/74	< 0.002	0.006	61.00	1.80	85.00	11.60
11/13/74	< 0.002	0.008	58.00	1.90	76.00	10.80
11/26/74	0.003	0.009	59.00	1.70	84.40	11.00
12/18/74	< 0.002	< 0.002	60.00	1.65	100.00	11.80
1/ 5/75	< 0.002	0.011	77.20	2.10	106.80	14.60
1/22/75	0.006	0.008	73.60	3.00	86.80	13.20
2/18/75	< 0.004	0.010	77.10	2.50	92.40	14.60
3/ 5/75	< 0.002	0.010	120.20	5.70	75.60	27.00
3/20/75	0.005	0.075	107.00	4.70	74.10	24.10
4/ 3/75	< 0.002	0.010	136.10	8.30	73.10	27.50
4/17/75	< 0.002	0.017	141.60	7.10	70.00	29.30
5/ 1/75	< 0.002	0.021	164.30	7.60	68.70	32.10
5/15/75	< 0.002	0.021	72.20	2.90	75.80	14.60
5/29/75	< 0.010	0.014	70.00	2.00	88.40	14.00
6/13/75	< 0.002	0.007	59.50	1.60	96.50	14.00
6/26/75	< 0.002	0.023	57.80	1.80	87.30	13.80
7/11/75	< 0.002	0.011	70.40	1.84	94.00	14.30
7/24/75	< 0.002	0.013	64.80	1.91	93.79	12.91

APPENDIX D-3 (Continued)

Date Mo/Day/Yr	Cl		SO_4	SiO_2	Alk
6/11/74	88.2			9.7	4.53
6/28/74	72.7			9.4	4.62
7/12/74	99.6			11.5	4.88
8/ 6/74	59.6			9.2	
8/20/74	72.5			6.5	4.97
9/ 5/74	74.9			10.3	6.28
9/17/74	74.8			9.0	
10/ 3/74	63.4	<	5.0	8.3	
10/17/74	68.9	<	5.0	8.1	4.87
10/29/74	88.7			8.4	4.94
11/13/74	111.3	<	5.0	9.3	4.24
11/26/74	100.1	<	5.0		5.75
12/18/74	88.9	<	5.0		5.14
1/ 5/75	117.3		7.5	9.0	5.68
1/22/75	113.2	<	5.0	8.2	5.17
2/18/75	118.1	<	5.0	9.6	6.22
3/ 5/75	168.6		24.4	16.7	5.67
3/20/75	166.6		37.2	11.8	3.50
4/ 3/75	176.8		19.0	20.0	6.02
4/17/75	198.9		30.9	19.4	5.33
5/ 1/75	238.5		22.4	22.7	5.96
5/15/75	111.6	<	5.0	10.6	4.77
5/29/75	104.5	<	5.0	9.0	
6/13/75	108.5	<	5.0	10.0	5.53
6/26/75	88.0		7.7	10.2	5.27
7/11/75	103.5	<	5.0	9.6	5.76
7/24/75	91.7	<	5.0	9.2	4.60

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

4. TAMIAMI CANAL Station TAM-06.5

Date Mo/Day/Yr		NO_x		NO_3		NO_2		NH_4	TKN	Total N
6/11/74	<	0.003	<	0.004	<	0.004	<	0.01	1.43	1.43
6/28/74		0.274		0.251		0.023			0.87	1.14
7/12/74		0.063		0.044		0.019		0.20	2.55	2.61
8/ 6/74		0.308		0.275		0.033		0.13		
9/ 5/74	<	0.003	<	0.008	<	0.004		0.39	1.37	1.37
9/10/74		0.052		0.036		0.016		0.28	1.45	1.50
9/17/74		0.202		0.168		0.034		0.40		
10/ 3/74		0.127		0.117		0.010		0.10	1.52	1.65
10/17/74		0.087		0.076		0.011		0.81	2.00	2.09
10/29/74		0.134		0.118		0.016		0.13	1.56	1.69
11/13/74		0.156		0.152	<	0.004		0.23	1.29	1.45
11/26/74		0.490		0.469		0.021		0.38	1.01	1.50
12/18/74		0.018		0.014	<	0.004		0.41	1.53	1.55
1/ 5/75		0.065		0.058		0.007		0.26	1.53	1.60
1/22/75		0.078		0.059		0.019		0.17	1.53	1.61
2/18/75		0.021	<	0.004		0.017		0.23	1.44	1.46
3/ 5/75		0.113		0.109	<	0.004		0.05	0.86	0.97
3/19/75		0.172		0.150		0.022		0.33	0.93	1.10
4/ 2/75		0.143		0.139	<	0.004		0.03	0.66	0.80
4/16/75	<	0.003	<	0.004	<	0.004	<	0.01	1.09	1.09
4/30/75		0.013		0.009	<	0.004		0.01	1.44	1.45
5/14/75		0.030		0.026	<	0.004		0.02	1.40	1.43
5/28/75		0.191		0.147		0.034		0.06	1.07	1.25
6/12/75		0.162		0.156		0.006		0.02	1.09	1.25
6/25/75						0.012		0.10	1.21	
7/10/75						0.016		0.30	1.50	
7/16/75										
7/23/75		0.249		0.232		0.017		0.16	1.27	1.52

APPENDIX D-4 (Continued)

Date Mo/Day/Yr	O-PO_4	T-PO_4	Na	K	Ca	Mg
6/11/74	0.008	0.037	55.00	3.50	32.60	13.80
6/28/74	0.007	0.042	17.00	1.00	46.00	3.80
7/12/74	0.002	0.025	24.50	1.19	62.00	4.40
8/ 6/74	0.005	0.020	22.00	1.10	77.00	5.20
9/ 5/74	0.021	0.015	24.00	0.80	72.20	5.40
9/10/74	0.009	0.021	22.00		80.00	5.75
9/17/74	< 0.002	0.010	51.00	1.70	84.50	9.50
10/ 3/74	< 0.002	0.006	40.00	1.70	75.80	8.20
10/17/74	< 0.002	0.015	21.00	1.00	71.60	5.00
10/29/74	< 0.002	0.023	24.00	1.30	75.40	4.80
11/13/74	0.007	0.013	26.00	1.20	66.20	4.80
11/26/74	0.004	0.012	23.00	1.00	76.60	4.80
12/18/74	< 0.002	< 0.002	38.00	0.50	73.20	5.20
1/ 5/75	< 0.002	0.008	42.80	1.00	86.80	6.00
1/22/75	0.003	0.006	41.40	1.00	70.80	6.40
2/18/75	< 0.004	0.008	41.70	1.20	52.50	6.20
3/ 5/75	0.005	0.014	22.10	0.90	81.40	5.20
3/19/75	0.006	0.033	24.70	1.10	74.80	5.30
4/ 2/75	0.004	0.022	24.80	0.70	76.80	4.60
4/16/75	< 0.002	0.019	32.60	1.70	66.30	5.10
4/30/75	0.009	0.029	63.40	3.60	54.60	17.30
5/14/75	0.004	0.027	56.80	3.70	43.20	15.90
5/28/75	0.005	0.025	25.80	1.40	78.80	6.00
6/12/75	0.003	0.013	27.10	1.10	94.00	6.60
6/25/75	< 0.002	0.034	22.70	1.20	80.90	5.80
7/10/75	0.005	0.027	20.60	1.12	78.90	5.20
7/10/75						
7/23/75	0.006	0.024	24.95	1.15	86.11	5.63

APPENDIX D-4 (Continued)

Date Mo/Day/Yr	Cl		SO_4	SiO_2	Alk
6/11/74	86.2			3.6	2.27
6/28/74	30.3			4.8	4.14
7/12/74	36.3			5.4	4.29
8/ 6/74	26.8			6.6	
8/ 5/74	25.2			5.3	4.56
9/10/74	34.1			6.2	4.55
9/17/74	74.8			9.1	
10/ 3/74	64.0	<	5.0	8.3	
10/17/74	24.9	<	5.0	5.2	4.55
10/29/74	26.1			4.2	4.21
11/13/74	40.8	<	5.0	4.8	3.35
11/26/74	40.4	<	5.0		4.28
12/18/74	56.5	<	5.0		3.56
1/ 5/75	73.6		5.2	2.2	4.05
1/22/75	62.5	<	5.0	3.7	4.31
2/18/75	71.2	<	5.0	3.8	4.61
3/ 5/75	33.3	<	5.0	2.8	4.00
3/19/75	39.0		21.9	4.3	2.91
4/ 2/75	69.8		6.7		3.41
4/16/75	37.9		14.7	2.5	3.46
4/30/75	95.3		47.7	4.6	3.30
5/14/75	86.7		43.3	3.8	2.76
5/28/75	37.1		9.5	4.5	4.27
6/12/75	44.6		5.6	4.8	4.38
6/25/75	33.2		9.7	5.7	4.27
7/10/75	32.3	<	5.0	4.6	4.43
7/10/75					
7/23/75	30.1		5.9	4.6	4.51

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

4. Tamiami Canal Station TAM-10.8

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
6/11/74	0.076	0.071	0.005	0.23	1.35	1.43
6/28/74	0.041	0.035	0.006	0.21	0.96	1.00
7/12/74	< 0.003	< 0.004	< 0.004	0.41	1.72	1.72
8/ 6/74	0.015	0.010	0.005	0.37		
8/ 5/74	0.020	< 0.008	0.012	0.38	1.30	1.32
8/17/74	0.199	0.167	0.032	0.43		
10/ 3/74	0.138	0.128	0.010	0.11	1.39	1.53
10/17/74	0.282	0.270	0.012	0.28	1.61	1.89
10/30/74	0.235	0.224	0.011	0.21	1.48	1.72
11/13/74	< 0.003	< 0.004	< 0.004	0.37	1.52	1.52
11/26/74	0.466	0.444	0.022	0.30	1.04	1.51
12/18/74	< 0.003	< 0.004	< 0.004	0.32	1.07	1.07
1/ 5/75	0.071	0.063	0.008	0.25	1.61	1.68
1/22/75	0.088	0.070	0.018	0.14	1.31	1.40
2/18/75	0.914	0.854	0.060	0.28	1.13	2.04
3/ 5/75	0.480	0.442	0.038	0.39	1.29	1.77
3/19/75	0.227	0.196	0.031	0.24	1.03	1.26
4/ 2/75	0.078	0.073	0.005	0.27	1.05	1.13
4/16/75	0.103	0.089	0.014	0.22	1.47	1.57
4/30/75	0.143	0.132	0.011	0.16	1.32	1.46
5/14/75	0.083	0.078	0.005	0.30	1.54	1.62
5/28/75	0.059	0.054	0.005	0.30	1.52	1.58
6/12/75	0.010	0.006	< 0.004	0.32	1.31	1.32
6/25/75			0.006	0.40	1.63	
7/10/75			0.011	0.34	1.50	
7/10/75						
7/23/75	0.061	0.057	< 0.004	0.30	1.46	1.52

APPENDIX D-4 (Continued)

Date Mo/Day/Yr		O-PO_4		T-PO_4	Na	K	Ca	Mg
6/11/74	<	0.002		0.011		1.10	80.20	6.60
6/28/74		0.003		0.010	20.00	1.00	54.00	3.80
7/12/74		0.003		0.007	25.80	1.13	61.40	4.40
8/ 6/74	<	0.002		0.009	22.00	0.90	78.40	5.60
9/ 5/74		0.003		0.013	23.00	0.80	75.60	5.60
9/17/74		0.004		0.013	51.00	1.70	83.00	9.50
10/ 3/74	<	0.002		0.004	41.00	1.80	76.40	8.20
10/17/74		0.005		0.016	26.00	1.40	71.60	5.40
10/29/74		0.024		0.104	21.00	1.20	79.20	4.20
11/13/74	<	0.002		0.003	26.00	1.10	68.40	5.60
11/26/74		0.004		0.013	22.00	1.00	78.80	4.80
12/18/74	<	0.002	<	0.002	30.00	1.10	87.40	6.60
1/ 5/75	<	0.002		0.008	42.60	0.90	86.00	5.90
1/22/75	<	0.002		0.010	40.00	1.00	76.20	6.50
2/19/75		0.197		0.227	21.80	1.20	84.80	4.20
3/ 5/75		0.120		0.144	22.10	1.20	86.40	4.80
3/19/75		0.014		0.208	24.60	1.10	86.20	5.20
4/ 2/75	<	0.002		0.006	39.00	1.00	90.40	6.70
4/16/75	<	0.002		0.007	36.90	1.10	84.50	6.90
4/30/75	<	0.002		0.005	33.20	1.00	82.10	6.40
5/14/75	<	0.002		0.013	34.60	1.20	78.20	6.50
5/28/75	<	0.002		0.007	35.00	1.00	85.40	7.20
6/12/75	<	0.002		0.006	27.10	1.00	85.00	6.60
6/25/75	<	0.002		0.007	28.80	0.80	82.80	6.20
7/10/75	<	0.002		0.007	25.10	1.01	80.20	5.50
7/10/75								
7/23/75	<	0.002		0.006	28.63	1.15	86.63	6.44

APPENDIX D-4 (Continued)

Date Mo/Day/Yr	Cl		SO_4	SiO_2	Alk
6/11/74	45.7			8.3	4.70
6/28/74	37.3			4.9	4.53
7/12/74	37.7			5.5	4.67
8/ 6/74	25.4			5.7	
8/ 5/74	28.0			5.2	4.58
9/17/74	74.8			9.1	
10/ 3/74	63.8	<	5.0	8.3	
10/17/74	25.5	<	5.0	5.4	4.58
10/28/74	23.0			4.4	4.29
11/13/74	51.4	<	5.0	5.2	3.47
11/26/74	44.0	<	5.0		4.27
12/18/74	41.2		15.3		4.37
1/ 5/75	73.6		5.4	2.6	4.02
1/22/75	61.5		5.0	3.6	4.22
2/18/75	31.6	<	5.0	4.1	4.41
3/ 5/75	32.3		6.1	4.4	4.05
3/19/75	34.8		21.3	4.4	3.06
4/ 2/75	80.8	<	5.0	3.3	4.79
4/16/75	55.8		10.9	4.8	4.68
4/30/75	52.5	<	5.0	4.6	4.91
5/14/75	56.5	<	5.0	5.2	4.72
5/28/75	50.6	<	5.0	5.0	4.90
6/12/75	48.8	<	5.0	5.6	4.81
6/25/75	41.0	<	5.0	9.0	4.62
7/10/75	34.3	<	5.0	4.9	4.73
7/10/75					
7/23/75	42.2	<	5.0	4.6	4.59

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

4. Tamiami Canal Station TAM-16.0

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
6/11/74	0.102	0.097	0.005	0.26	1.52	1.62
6/28/74	0.093	0.089	0.004	0.08	0.55	0.64
7/12/74	0.076	0.070	0.006	0.01	1.25	1.33
8/ 6/74	0.068	0.064	< 0.004	0.03	1.94	2.01
8/20/74	0.042	0.038	0.004	0.12	1.64	1.68
9/ 5/74	0.020	0.007	0.013	0.12	1.03	1.05
9/17/74	0.200	0.168	0.032	0.43		
10/ 3/74	0.131	0.120	0.011	0.10	1.43	1.56
10/17/74	0.221	0.209	0.012	0.28	1.35	1.57
10/29/74	< 0.003	< 0.004	< 0.004	0.20	2.21	2.21
11/13/74	< 0.003	< 0.004	< 0.004	0.42	2.01	2.01
11/13/74						
11/26/74	1.947	1.923	0.024	0.19	1.45	3.40
12/18/74	0.360	0.346	0.014	0.07	0.70	1.06
1/ 5/75	0.409	0.389	0.020	0.15	1.01	1.42
1/22/75	0.573	0.524	0.049	0.03	0.87	1.44
2/18/75	0.273	0.254	0.019	0.02	1.00	1.27
3/ 5/75	0.020	0.016	< 0.004	0.23	1.27	1.29
3/19/75						
4/ 2/75	0.034	0.030	< 0.004	0.44	1.23	1.26
4/16/75	0.063	0.059	< 0.004	0.38	1.27	1.33
4/30/75	0.056	0.052	0.004	0.44	1.87	1.93
5/14/75	0.048	0.044	< 0.004	0.41	1.81	1.86
5/28/75	0.094	0.090	0.004	0.34	1.65	1.74
6/12/75	0.068	0.062	0.006	0.13	1.50	1.57
6/25/75			0.005	0.03	1.41	
7/10/75			0.004	0.13	1.42	
7/10/75						
7/23/75	0.019	0.015	< 0.004	0.06	1.34	1.36

APPENDIX D-4 (Continued)

Date Mo/Day/Yr	O-PO_4	T-PO_4	Na	K	Ca	Mg
6/11/74	< 0.002	0.005	32.00	1.90	79.40	7.00
6/28/74	0.009	0.009	37.00	1.20	94.00	8.80
7/12/74	< 0.002	0.007	19.00	1.00	89.60	7.60
8/ 6/74	< 0.002	0.007	28.00	0.80	81.40	6.70
8/20/74	< 0.002	0.002	35.00	1.00	90.60	7.80
9/ 5/74	0.011	0.006	32.00	0.60	81.60	7.20
9/17/74	0.005	0.018	51.00	1.80	83.50	9.50
10/ 3/74	0.075	0.003	41.00	1.70	77.60	8.40
10/17/74	0.004	0.017	21.00	1.30	72.20	5.00
10/29/74	0.076	0.005	27.00	1.00	65.20	4.40
11/13/74	< 0.002	0.002	31.00	1.30	59.00	4.60
11/13/74						
11/26/74	0.055	0.015	23.00	1.00	78.40	4.80
12/18/74	< 0.002	< 0.002	25.00	1.05	85.20	5.40
1/ 5/75	0.017	0.031	23.60	0.90	91.80	4.90
1/22/75	0.033	0.050	23.00	1.00	76.80	5.00
2/18/75	0.011	0.020	29.40	1.40	81.20	5.00
3/ 5/75	< 0.002	0.005	42.90	1.00	88.90	7.30
3/19/75						
4/ 2/75	< 0.002	0.004	46.60	1.00	97.10	7.90
4/16/75	< 0.002	0.006	48.60	1.00	96.20	8.10
4/30/75	< 0.002	0.004	52.80	2.30	94.70	8.20
5/14/75	< 0.002	0.010	40.50	0.90	91.30	8.00
5/28/75	< 0.002	0.007	44.00	0.90	94.40	8.20
6/12/75		0.012	41.60	1.00	95.10	8.30
6/25/75	< 0.002	0.011	41.40	0.80	89.80	8.10
7/10/75	< 0.002	0.009	37.50	0.85	85.90	6.80
7/10/75						
7/23/75	< 0.002	0.007	41.44	1.22	91.58	7.44

APPENDIX D-4 (Continued)

Date Mo/Day/Yr	Cl		SO_4	SiO_2	Alk
6/11/74	54.3			11.3	8.72
6/28/74	55.4			6.8	4.35
7/12/74	52.6			7.4	5.07
8/ 6/74	39.7			6.6	
8/20/74	49.7			6.5	4.95
9/ 5/74	39.6			5.8	4.88
9/17/74	74.8			9.1	
10/ 3/74	63.8	<	5.0	9.1	
10/17/74	30.3	<	5.0	5.2	4.59
10/29/74	40.2			3.3	3.32
11/13/74	67.0	<	5.0	3.7	2.57
11/13/74					
11/26/74	50.2	<	5.0		4.02
12/18/74	35.2		5.1		4.36
1/ 5/75	44.8		8.7	4.2	4.22
1/22/75	52.5		6.0	4.2	3.75
2/18/75	34.2	<	5.0	3.6	4.39
3/ 5/75	70.1	<	5.0	4.3	4.60
3/19/75					
4/ 2/75	81.1	<	5.0	4.3	1.41
4/16/75	71.7	<	5.0	5.7	5.43
4/30/75	70.5	<	5.0	5.9	
5/14/75	64.8	<	5.0	5.7	5.98
5/28/75	31.0	<	5.0	5.4	3.22
6/12/75	68.8	<	5.0	5.4	5.03
6/25/75	63.0	<	5.0	5.6	5.08
7/10/75	56.4	<	5.0	4.9	4.96
7/10/75					
7/23/75	50.2	<	5.0	5.2	4.89

APPENDIX D. LABORATORY RESULTS FOR SAMPLING DATES

5. Snapper Creek Station TSC-S3.5

Date Mo/Day/Yr	NO_x	NO_3	NO_2	NH_4	TKN	Total N
6/11/74	0.279	0.243	0.036	0.76	2.25	2.53
6/28/74	0.123	0.085	0.038	1.25	1.54	1.66
7/12/74	0.090	0.064	0.026		1.61	1.70
8/ 6/74	0.105	0.094	0.011	0.43		
8/20/74	0.430	0.416	0.014		1.94	2.37
9/ 5/74	0.220	0.216	< 0.004	0.80	1.93	2.15
9/17/74	0.199	0.167	0.032	0.43		
10/ 3/74	0.145	0.133	0.012	0.10	1.45	1.60
10/17/74	0.322	0.310	0.012	0.28	0.78	1.10
10/29/74	< 0.003	< 0.004	< 0.004	0.18	1.72	1.72
11/13/74	0.544	0.515	0.029	0.61	1.45	1.99
11/26/74	0.449	0.430	0.019	0.25	1.19	1.64
12/18/74	0.477	0.454	0.023	0.30	1.01	1.49
1/ 5/75	0.475	0.454	0.021	0.15	1.00	1.48
1/22/75	0.718	0.669	0.049	0.10	0.85	1.57
2/18/75	0.020	< 0.004	0.016	0.32	1.32	1.34
3/ 5/75	0.054	0.050	< 0.004	0.37	1.24	1.29
3/19/75	0.026	0.013	0.013	0.07	1.27	1.30
4/ 2/75	0.307	0.273	0.034	0.21	0.70	1.01
4/16/75	0.101	0.087	0.014	0.23	1.37	1.47
4/30/75				0.07	1.18	
5/14/75	0.381	0.350	0.031	0.18	1.41	1.79
5/28/75	0.429	0.394	0.035	0.20	1.35	1.78
6/12/75	0.735	0.559	0.176		1.63	2.37
6/25/75			0.047	0.65	1.85	
7/10/75			0.009	0.38	1.36	
7/10/75						
7/23/75	0.083	0.079	< 0.004	0.15	1.11	1.19

APPENDIX D-5 (Continued)

Date Mo/Day/Yr	O-PO_4	T-PO_4	Na	K	Ca	Mg
4/11/74	0.154	0.197	25.00	2.00	72.80	5.00
4/28/74	0.228	0.335	25.00	2.50	80.00	5.20
5/12/74	0.162	0.217	24.00	1.25	78.00	5.00
5/ 6/74	0.039	0.076	22.00	1.00	80.80	5.00
6/20/74	0.079	0.199	24.00	1.10	84.20	5.40
9/ 5/74	0.116	0.152	22.00	0.80	73.40	5.00
9/17/74	0.014	0.011	51.00	1.80	83.00	9.50
10/ 3/74	< 0.002	0.004	41.00	1.80	76.40	8.20
10/17/74	0.004	0.015	21.00	1.30	69.40	4.80
10/29/74	0.005	0.005	25.00	1.00	73.80	5.20
11/13/74	0.132	< 0.100	23.00	1.50	73.20	4.40
11/26/74	0.004	0.014	23.00	1.10	78.80	4.80
12/18/74	0.091	0.099	21.00	1.05	62.60	5.00
1/ 5/75	0.012	0.030	22.50	0.90	92.40	4.90
1/22/75	0.041	0.050	23.00	1.00	79.40	5.40
2/18/75	< 0.004	0.007	32.20	1.50	79.60	6.00
3/ 5/75	< 0.002	0.008	26.90	1.20	65.60	6.20
3/19/75	0.005	0.006	27.30	1.10	78.40	5.80
4/ 2/75	0.103	0.137	25.00	1.10	74.60	4.20
4/16/75	< 0.002	0.008	36.90	1.00	85.10	7.10
4/30/75	0.076	0.065	28.60	1.20		6.30
5/14/75	0.059	0.085	28.30	1.60	71.10	6.60
5/28/75	0.086	0.108	29.60	1.00	84.70	5.90
6/12/75	0.232	0.242	25.10	1.40	81.10	5.30
6/25/75	0.078	0.163	23.60	0.80	83.10	5.20
7/10/75	0.026	0.047	21.80	0.85	63.50	4.70
7/10/75						
7/23/75	0.004	0.025	23.67	1.05	51.58	5.02

APPENDIX D-5 (Continued)

Date Mo/Day/Yr	Cl		SO_4	SiO_2	Alk
4/11/74	34.3			6.5	4.53
4/28/74	34.8			5.8	4.31
7/12/74	35.3			5.6	4.49
5/ 6/74	31.6			6.7	
5/28/74	33.5			5.7	4.56
6/ 5/74	35.2			5.2	4.55
6/17/74	74.8			9.0	
10/ 3/74	64.0	<	5.0	8.4	
10/17/74	27.3	<	5.0	5.2	4.55
10/29/74	30.1			4.3	4.29
11/13/74	36.7		6.6	5.2	3.41
11/26/74	38.[illegible]	<	5.0		
12/18/74	32.6		10.0		4.39
1/ 5/75	36.8		9.2	4.5	4.27
1/22/75	55.3		7.3	4.3	3.50
2/18/75	43.2	<	5.0	4.5	4.65
3/ 5/75	45.2	<	5.0	4.7	4.48
3/19/75	75.5		17.9	4.0	3.33
4/ 2/75	51.0		7.9	3.6	3.58
4/16/75	55.8		7.2	4.8	4.68
4/30/75					
5/14/75	40.9		7.6	4.6	4.11
5/28/75	42.9	<	5.0	6.0	4.51
6/12/75	40.6		7.5	5.1	4.36
6/25/75	34.6		8.7	5.4	4.33
7/10/75	35.7	<	5.0	4.8	4.68
7/10/75					
7/23/75	35.5	<	5.0	4.6	4.66

APPENDIX E. FIELD DATA FOR EACH SAMPLING DATE

1. C-51

STATION = WPB-12.0 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/14/74	930.	0.0	26.5	2.7	1000.	7.75
6/14/74	930.	0.0				
6/28/74		0.0				
7/12/74		0.0			640.	7.51
7/26/74	945.	0.0	28.0	0.9	615.	
8/ 7/74	1400.	0.0	27.5	3.6	430.	6.10
8/ 7/74	1355.	3.0	27.5	3.5	440.	6.40
8/22/74	1020.	0.0	28.5	1.7	450.	7.40
8/22/74	1025.	2.0	28.0	2.0	450.	7.40
9/ 6/74	1325.	0.0	28.5	4.3	320.	7.40
9/ 6/74	1320.	2.0	28.0	4.5	475.	7.40
9/18/74	1230.	0.0	26.5	1.7	450.	7.40
9/18/74	1215.	3.0	26.5	2.1	450.	7.40
10/ 4/74	1250.	0.0	25.5	1.9	430.	7.40
10/ 4/74	1300.	3.0	25.0	2.0	480.	7.40
10/16/74	1520.	0.0	25.6	1.8	460.	7.40
10/16/74	1530.	3.0	25.6	2.0	470.	7.40
10/29/74	1302.	0.0	23.0	4.1	335.	7.50
10/29/74	1307.	2.0	22.5	3.6	760.	7.70
11/14/74	1340.	0.0	13.5	4.4	760.	7.40
11/14/74	1345.	1.5	19.0	3.9	790.	7.60
11/27/74	1620.	0.0	20.9	1.8	460.	7.40
11/27/74	1630.	3.0	21.2	2.2	480.	7.40
12/18/74	1430.	0.0	18.0		700.	7.30
12/18/74	1432.	2.0	18.0		700.	7.50
1/ 6/75	1610.	0.0	22.1	4.1	650.	6.80
1/ 6/75	1620.	2.0	22.1	4.2	670.	6.70
1/23/75	1730.	0.0	21.0	3.7	550.	7.70
1/23/75	1735.	2.0	22.0	3.0	580.	7.70
2/19/75	1415.	0.0	23.3	4.3	670.	6.80
2/19/75	1417.	1.5	23.0	4.4	730.	6.80
3/ 6/75		0.0				
3/ 6/75		2.0				
3/21/75	1310.	0.0	22.5	6.6	600.	6.90
3/21/75	1320.	3.0	22.5	7.0	670.	6.70
4/ 4/75	1344.	0.0	24.8	5.5	605.	7.50
4/ 4/75	1348.	1.5	24.5	5.3	620.	7.40
4/18/75	1158.	0.0	25.0	4.7	740.	7.20
4/18/75	1200.	1.5	24.5	4.3	740.	7.20
5/ 2/75	1243.	0.0	27.0	4.3	740.	7.20

STATION = WPB-12.0 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
5/ 2/75	1244.	1.5	26.5	4.1	740.	7.20
5/16/75	1028.	0.0	25.4	3.4	1650.	6.90
5/16/75	1030.	2.0	25.4	3.2	1670.	6.90
5/30/75	1015.	0.0	27.4	2.7	1080.	7.10
5/30/75	1017.	2.0	27.0	2.5	1080.	7.10
6/11/75	1055.	0.0	28.0	3.7	740.	7.00
6/11/75	1057.	2.0	28.0	3.3	730.	7.00
6/27/75	1052.	0.0	25.0	2.4	1500.	7.30
6/27/75	1055.	2.0	25.0	2.2	1530.	7.20
7/ 9/75	1235.	0.0	28.5	2.4	590.	6.70
7/ 9/75	1240.	2.0				
7/25/75	1100.	0.0	26.7	2.5	1470.	7.30
7/25/75	1105.	1.5	26.4	2.0	1500.	7.20

STATION = WPB-13.5 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/14/74	945.	0.0	26.5	5.2	1300.	7.70
6/14/74	945.	0.0				
6/28/74		0.0				
7/12/74		0.0			610.	7.49
7/26/74	1000.	0.0	28.1	1.5	875.	
8/ 7/74	1410.	0.0	27.2	3.5	340.	6.10
8/ 7/74	1415.	3.0	27.0	3.4	380.	6.20
8/22/74	1045.	0.0	28.0	1.9	410.	7.20
8/22/74	1050.	3.0	28.0	1.9	420.	7.40
9/ 6/74	1340.	0.0	28.5	4.5	410.	7.40
9/ 6/74	1335.	3.0	28.0	4.0	500.	7.40
9/18/74	1300.	0.0	27.0	1.9	400.	7.10
9/18/74	1310.	2.0	27.0	2.0	450.	7.30
10/ 4/74	1350.	0.0	25.0	1.8	410.	7.20
10/ 4/74	1355.	2.0	25.0	2.0	470.	7.30
10/16/74	1610.	0.0	25.4	2.0	410.	7.10
10/16/74	1620.	2.0	25.4	2.1	444.	7.30
10/29/74	1325.	0.0	22.5	2.5	1100.	7.40
10/29/74	1329.	3.5	22.1	1.6	1100.	7.70
11/14/74	1400.	0.0	19.5	3.4	420.	7.40
11/14/74	1410.	2.5	19.0	2.4	580.	7.70
11/27/74	1540.	0.0	21.4	2.1	410.	7.10
11/27/74	1550.	2.0	21.6	2.1	450.	7.20
12/18/74	1455.	0.0	17.6		375.	7.30
12/18/74	1500.	3.0	17.5		640.	7.60
1/ 6/75	1530.	0.0	22.5	3.8	680.	7.30
1/ 6/75	1540.	2.0	22.5	3.7	690.	7.20
1/23/75	1700.	0.0	22.5	5.0	620.	7.50
1/23/75	1710.	2.0	22.8	5.0	650.	7.50
2/19/75	1435.	0.0	23.4	6.8	330.	6.80
2/19/75	1445.	2.0	23.4	4.7	460.	6.80
3/ 6/75		0.0				
3/ 6/75		2.0				
3/21/75	1230.	0.0	22.7	6.8	640.	7.10
3/21/75	1240.	3.0	22.7	5.0	680.	7.00
4/ 4/75	1323.	0.0	25.0	6.0	470.	7.50
4/ 4/75	1324.	3.5	24.5	5.6	520.	7.50
4/18/75	1133.	0.0	25.1	5.8	710.	7.30
4/18/75	1135.	3.0	25.0	4.8	710.	7.30
5/ 2/75	1219.	0.0	27.5	5.6	740.	7.10

STATION = WRB-13.5 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
5/ 2/75	1220.	3.0	27.0	4.6	750.	6.90
5/16/75	1000.	0.0	25.5	6.0	1490.	7.00
5/16/75	1003.	1.0	25.5	5.8	1510.	7.00
5/30/75	953.	0.0	26.6	2.1	1110.	7.20
5/30/75	955.	3.5	26.0	1.0	1110.	7.10
6/11/75	1035.	0.0	28.2	4.2	850.	7.10
6/11/75	1037.	3.5	28.0	4.2	840.	7.10
6/27/75	1015.	0.0	25.0	2.6	1550.	7.30
6/27/75	1017.	4.0	25.0	1.1	1620.	7.30
7/ 9/75	1210.	0.0	28.5	2.1	640.	6.60
7/ 9/75	1212.	4.0				
7/25/75	1010.	0.0	26.0	1.4	1450.	7.50
7/25/75	1013.	3.5	25.5	1.2	1660.	7.40

STATION = WPB-18.0 CODE

DATE MO/DA/YR	TIME HOUR.MTN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/14/74	1000.	0.0	25.3	3.4	1350.	7.45
6/14/74	1000.	0.0				
6/28/74		0.0				
7/12/74		0.0			770.	7.48
7/26/74	1015.	0.0	27.8	0.7	550.	
8/ 7/74	1430.	0.0	27.3	5.1	540.	6.20
8/ 7/74	1425.	2.0	27.0	5.0	540.	6.30
8/22/74	1120.	0.0	28.0	1.3	410.	7.10
8/22/74	1125.	3.0	27.5	1.3	430.	7.30
8/27/74	1150.	0.0	28.5	1.2	390.	7.20
8/27/74	1155.	2.0	28.0	1.4	390.	7.40
8/28/74	955.	0.0	28.5	1.4	460.	7.10
8/28/74	1000.	2.0	28.4	1.4	470.	7.30
9/ 6/74	1405.	0.0	29.0	4.1	475.	7.20
9/ 6/74	1400.	2.0	28.0	3.0	515.	7.15
9/18/74	1400.	0.0	27.0	1.3	400.	7.10
9/18/74	1410.	2.0	27.0	1.4	420.	7.20
10/ 4/74	1400.	0.0	25.5	1.4	400.	7.00
10/ 4/74	1450.	2.0	25.5	1.7	420.	7.20
10/16/74	1650.	0.0	25.5	1.5	400.	7.00
10/16/74	1700.	2.0	25.4	1.5	420.	7.20
10/29/74	1439.	0.0	23.0	3.9	1050.	7.40
10/29/74	1449.	1.0	22.5	2.5	1060.	7.50
11/14/74	1417.	0.0	21.5	3.5	820.	7.20
11/14/74	1419.	1.5	20.0	5.6	850.	7.20
11/27/74	1510.	0.0	20.7	1.6	430.	7.00
11/27/74	1520.	2.0	20.8	1.6	440.	7.20
12/18/74	1530.	0.0	18.0		650.	7.20
12/18/74	1540.	1.0	18.0		680.	7.20
1/ 6/75	1440.	0.0	22.7	4.5	630.	7.50
1/ 6/75	1450.	2.0	22.4	4.5	650.	7.60
1/23/75	1640.	0.0	22.7	6.0	480.	7.20
1/23/75	1630.	2.0	22.5	6.2	500.	7.20
2/19/75	1515.	0.0	23.5	7.4	450.	6.80
2/19/75	1525.	2.0	23.2	7.3	480.	6.90
3/ 6/75		0.0				
3/ 6/75		2.0				
3/31/75	1100.	0.0	22.5	6.7	630.	7.40
3/31/75	1115.	3.0	22.4	5.0	690.	7.20
4/ 4/75	1257.	0.0	24.5	6.0	510.	7.60

STATION = WPB-18.0 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
4/ 4/75	1259.	2.0	24.5	5.8	530.	7.60
4/13/75	1110.	0.0	24.1	5.8	700.	7.40
4/18/75	1112.	2.0	24.1	5.8	700.	7.40
5/ 2/75	1130.	0.0	26.4	7.2	740.	7.30
5/ 2/75	1133.	1.0	26.2	7.1	740.	7.30
5/16/75	945.	0.0	24.8	3.4	1820.	6.75
5/16/75	947.	1.5	24.8	3.2	1820.	6.75
5/30/75	932.	0.0	26.6	3.0	1130.	7.20
5/30/75	935.	1.5	26.5	2.5	1130.	7.20
6/11/75	945.	0.0	25.6	4.1	700.	7.00
6/11/75	947.	1.5	25.6	3.9	730.	7.00
6/27/75	945.	0.0	24.5	2.1	1520.	6.40
6/27/75	947.	2.0	24.1	1.8	1590.	6.60
7/ 9/75	1143.	0.0	27.7	1.9	410.	6.60
7/ 9/75	1146.	1.5				
7/25/75	935.	0.0	25.6	2.1	1670.	7.50
7/25/75	939.	1.0	25.0	1.5	1700.	7.50

STATION = WPB-22.0 CODE

DATE MO/DA/YR	TIME HOUR,MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/14/74	1015.	0.0	27.0	1.5	1750.	7.35
6/14/74	1015.	0.0				
6/28/74		0.0				
7/12/74		0.0			645.	7.60
7/26/74	1030.	0.0	28.3	1.8	370.	
8/ 7/74	1445.	0.0	27.5	4.7	270.	5.90
8/ 7/74	1450.	1.0	27.5	4.1	270.	6.00
8/22/74	1200.	0.0	28.5	1.0	320.	7.00
8/22/74	1205.	1.0	28.5	1.2	270.	7.10
9/ 6/74	1450.	0.0	29.5	7.0	630.	7.15
9/ 6/74	1445.	2.0	28.0	4.0	640.	7.10
9/18/74	1430.	0.0	26.5	1.0	325.	7.10
9/18/74	1440.	2.0	26.5	1.5	300.	7.10
10/ 4/74	1520.	0.0	25.0	1.5	350.	7.00
10/ 4/74	1550.	2.0	25.0	2.0	360.	7.10
10/16/74	1740.	0.0	25.6	1.0	325.	7.10
10/16/74	1750.	2.0	25.5	1.6	340.	7.10
10/29/74	1411.	0.0	22.9	5.9	1070.	7.70
10/29/74	1415.	0.0	22.1	5.1	1070.	7.70
11/14/74	1435.	0.0	20.5	6.7	360.	7.50
11/14/74	1440.	1.0	20.5	5.2	620.	7.20
11/27/74	1410.	0.0	20.8	1.5	350.	7.10
11/27/74	1420.	2.0	20.5	1.6	400.	7.10
12/18/74	1515.	0.0	17.5		710.	7.20
12/18/74	1516.	0.5	17.0		710.	7.20
1/ 6/75	1340.	0.0	22.7	6.7	600.	7.30
1/ 6/75	1350.	2.0	22.6	4.3	670.	7.30
1/23/75	1600.	0.0	21.9	3.8	540.	7.60
1/23/75	1520.	2.0	22.6	3.5	570.	7.50
2/19/75	1455.	0.0	23.4	7.0	560.	7.20
2/19/75	1457.	0.5	23.3	7.2	600.	7.20
3/ 6/75		0.0				
3/ 6/75		2.0				
3/21/75	1000.	0.0	22.5	7.2	600.	7.20
3/21/75	1010.	2.0	22.5	6.0	710.	7.20
4/ 4/75	1226.	0.0	25.2	6.9	600.	7.70
4/ 4/75	1229.	0.5	25.0	6.5	610.	7.70
4/18/75	1040.	0.0	24.8	6.5	690.	7.60
4/18/75	1043.	0.5	24.8	6.4	690.	7.60
5/ 2/75	1114.	0.0	26.9	7.1	700.	7.00

STATION = WPR-22.0 CODE

DATE MO/DA/YR	TIME HOUR.MTN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
5/ 2/75	1117.	0.5	26.9	7.3	690.	7.00
5/16/75	920.	0.0	25.0	3.6	1580.	6.80
5/16/75	922.	1.0	25.0	3.5	1750.	6.80
5/30/75	910.	0.0	27.5	1.8	1160.	7.20
5/30/75	912.	0.5	27.5	1.3	1160.	7.20
6/11/75	915.	0.0	29.0	2.3	510.	6.70
6/11/75	917.	1.0	28.8	1.6	520.	6.70
6/27/75	900.	0.0	25.5	3.4	1300.	5.50
6/27/75	915.	1.0	24.5	2.3	1460.	6.60
7/ 9/75	1112.	0.0	29.2	2.5	330.	6.40
7/ 9/75	1115.	1.0				
7/25/75	915.	0.0	26.5	4.2	1260.	7.90
7/25/75	918.	0.5	26.2	2.6	1280.	7.90

APPENDIX E. FIELD DATA FOR EACH SAMPLING DATE

2. Hillsboro Canal

STATION = HBC-00.0 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/11/74	1735.	0.0	27.0		380.	6.80
6/11/74	1735.	2.0	27.0		590.	7.10
6/28/74	1635.	0.0	25.6	1.4	452.	7.20
6/28/74	1635.	2.0	25.5	1.2	660.	7.20
7/12/74	1030.	0.0	26.6	1.1	820.	7.30
7/12/74	1030.	2.0	27.0	1.0	843.	7.50
8/ 7/74	1100.	0.0	26.0	2.6	760.	6.20
8/ 7/74	1105.	3.0	26.0	1.5	760.	6.50
8/20/74		0.0				
9/ 6/74	1050.	0.0				
9/18/74	1100.	0.0	25.0	1.4	450.	7.20
9/18/74	1110.	1.0	24.8	1.0	470.	7.20
10/ 4/74	900.	0.0	25.0	1.4	460.	7.20
10/ 4/74	920.	1.0	25.0	1.2	470.	7.20
10/16/74	1830.	0.0	25.6	1.4	460.	7.20
10/16/74	1835.	1.0	25.5	1.0	470.	7.20
10/29/74	1108.	1.5	22.5	2.5	710.	7.40
10/29/74	1105.	0.0	22.6	2.7	690.	7.30
11/14/74	1040.	0.0	20.6	4.4	535.	7.20
11/14/74	1050.	1.5	20.5	4.2	540.	7.40
11/27/74	1240.	0.0	21.3	1.4	500.	7.20
11/27/74	1250.	2.0	21.2	1.2	510.	7.20
12/18/74	1100.	0.0	18.8		680.	7.10
12/18/74	1104.	1.5	19.0		690.	7.20
1/ 6/75	1200.	0.0	22.3	4.0	860.	7.10
1/ 6/75	1210.	2.0	22.3	3.6	880.	7.30
1/23/75	1500.	0.0	22.8	4.0	630.	7.70
1/23/75	1400.	2.0	22.4	4.1	700.	7.70
2/19/75	1110.	0.0	23.0	7.4	470.	7.20
2/19/75	1120.	2.0	22.5	7.2	540.	7.20
3/ 6/75		0.0				
3/ 6/75		2.0				
3/20/75	1650.	0.0	24.0	7.5	780.	7.10
3/20/75	1730.	3.0	24.0	6.0	790.	7.10
4/ 3/75	1600.	0.0	25.0	3.8	500.	7.00
4/ 3/75	1615.	2.0	25.0	3.6	510.	7.00
4/17/75	1532.	0.0	25.5	6.6	920.	7.80
4/17/75	1534.	1.5	25.5	5.7	970.	7.70
5/ 1/75	1034.	0.0	26.2	6.1	990.	7.50
5/ 1/75	1035.	1.5	25.6	5.1	990.	7.50

STATION = HBC-90.0 CODE

DATE MO/DA/YR	TIME HOUR.MTN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
5/15/75	1413.	0.0	25.0	2.5	1700.	6.50
5/15/75	1415.	1.5	24.5	1.5	1740.	6.60
5/29/75		0.0				
5/29/75		0.0				
6/13/75	1415.	0.0	28.4	2.5	920.	6.80
6/13/75	1418.	1.5	27.2	0.9	920.	6.70
6/26/75	1314.	0.0	26.1	7.7	1610.	7.30
6/26/75	1316.	2.0	25.0	2.8	1690.	7.30
7/11/75	1500.	0.0	27.1	0.9	1750.	6.90
7/11/75	1505.	1.5				
7/24/75	1528.	0.0	25.9	3.2	1420.	7.20
7/24/75	1530.	2.0	24.4	0.7	1700.	7.10

STATION = HBC-01.0 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/11/74	1815.	0.0				
6/28/74	1700.	0.0	25.7	1.9	712.	7.20
6/28/74	1700.	2.0	25.5	1.1	770.	7.10
7/12/74	1015.	0.0	27.0	0.7	840.	7.40
7/12/74	1015.	3.0	26.5	0.3	845.	7.50
8/ 7/74	1025.	0.0	26.5	2.4	370.	6.30
8/ 7/74	1030.	3.0	27.0	1.4	560.	6.40
8/20/74		0.0				
9/ 6/74	1030.	0.0	27.0	1.4	550.	7.20
9/ 6/74	1025.	3.0	26.5	1.3	490.	7.40
9/18/74	1025.	0.0	25.0	1.9	700.	7.30
9/18/74	1015.	3.0	25.0	1.5	730.	7.30
10/ 4/74	1000.	0.0	26.0	2.0	710.	7.30
10/ 4/74	1010.	3.0	26.0	1.6	740.	7.40
10/16/74	1200.	0.0	25.2	1.9	700.	7.30
10/16/74	1210.	3.0	25.2	1.6	730.	7.30
10/29/74	1050.	0.0	23.0	2.2	395.	7.30
10/29/74	1055.	2.0	22.5	1.2	520.	7.70
11/14/74	1009.	0.0	20.5	5.6	565.	7.20
11/14/74	1011.	2.5	20.0	6.0	570.	7.60
11/27/74	1120.	0.0	21.0	1.9	700.	7.30
11/27/74	1130.	2.0	20.8	1.6	710.	7.30
12/18/74	1035.	0.0	18.0		700.	7.10
1/ 6/75	1115.	0.0	22.6	4.7	900.	7.20
1/ 6/75	1120.	2.0	22.5	4.3	970.	7.50
1/23/75	1340.	0.0	21.9	3.9	680.	7.40
1/23/75	1300.	2.0	22.3	4.1	680.	7.60
2/19/75	1043.	0.0	23.4	6.8	680.	7.00
2/19/75	1045.	2.5	22.5	1.8	870.	6.70
3/ 6/75		0.0				
3/ 6/75		2.0				
3/20/75	1540.	0.0	24.1	4.7	810.	7.20
3/20/75	1610.	2.0	24.0	4.5	830.	7.20
4/ 3/75	1540.	0.0	25.5	4.6	480.	7.10
4/ 3/75	1710.	3.0	25.5	4.4	470.	7.00
4/17/75	1505.	0.0	26.3	7.0	430.	7.70
4/17/75	1510.	2.0	25.5	4.4	520.	7.20
5/ 1/75	1005.	0.0	27.5	6.6	990.	7.40
5/ 1/75	1007.	2.5	26.0	1.8	980.	7.00
5/15/75	1347.	0.0	25.4	3.2	1690.	6.40

STATION = HBC-61.0 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
5/15/75	1350.	3.0	24.4	1.7	1780.	6.50
5/29/75	1320.	0.0	26.9	2.0	890.	6.90
5/29/75	1322.	3.0	26.0	0.4	900.	6.80
6/13/75	1350.	0.0	29.4	2.1	920.	6.80
6/13/75	1352.	3.0	27.0	0.6	930.	6.70
6/26/75	1250.	0.0	26.2	6.6	1450.	7.50
6/26/75	1253.	3.0	24.3	2.5	1540.	7.20
7/11/75	1405.	0.0	26.5	0.9	1700.	6.90
7/11/75	1408.	3.0				
7/24/75	1505.	0.0	27.0	6.9	1370.	7.30
7/24/75	1507.	3.0	25.3	0.6	1640.	7.20

STATION = HBC-04.2 CODE

DATE MO/DA/YR	TIME HOUR.MTN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/11/74	1645.	0.0	27.3		550.	7.10
6/11/74	1645.	2.0	27.0		895.	7.20
6/28/74	1645.	0.0	26.5	7.0	530.	7.70
6/28/74	1645.	2.0				
7/12/74	1000.	0.0	27.5	5.7	660.	7.70
8/ 7/74	1125.	0.0	27.0	2.8	560.	6.10
8/ 7/74	1130.	3.0	26.5	1.1	600.	6.20
8/20/74		0.0				
9/ 6/74	950.	0.0	27.0	6.2	460.	7.50
9/17/74	940.	3.0	25.5	6.0	530.	7.70
9/18/74	930.	0.0	26.0	6.5	500.	7.60
10/ 4/74	1040.	0.0	25.0	6.6	500.	7.60
10/ 4/74	1050.	3.0	25.0	6.5	530.	7.70
10/16/74	1250.	0.0	25.3	6.5	500.	7.60
10/16/74	1300.	3.0	25.3	6.0	560.	7.70
10/29/74	1025.	0.0	23.0	3.4	480.	7.50
10/29/74	1027.	2.0	22.7	2.8	730.	7.70
11/14/74	950.	0.0	20.5	3.2	535.	7.30
11/14/74	952.	1.5	20.5	3.2	810.	7.60
11/27/74	1030.	0.0	20.9	6.5	500.	7.60
11/27/74	1050.	3.0	20.5	6.0	560.	7.60
12/18/74	1014.	0.0	18.5		610.	7.10
12/18/74	1016.	1.5	18.5		640.	7.20
1/ 5/75	1000.	0.0	22.5	4.5	800.	7.30
1/ 5/75	1010.	2.0	22.5	4.5	850.	7.20
1/23/75	1210.	0.0	22.4	3.6	640.	7.10
1/23/75	1130.	2.0	22.4	3.7	670.	7.40
2/19/75	1035.	0.0	23.0	5.5	550.	6.90
2/19/75	1040.	2.0	22.8	4.8	640.	4.90
3/ 6/75		0.0				
3/ 6/75		2.0				
3/20/75	1420.	0.0	23.5	5.0	810.	7.20
3/20/75	1450.	2.0	23.0	5.0	850.	7.10
4/ 3/75	1720.	0.0	25.2	4.8	460.	7.20
4/ 3/75	1735.	2.0	25.0	4.6	480.	7.00
4/17/75	1440.	0.0	25.8	5.6	960.	7.50
4/17/75	1450.	2.0	25.4	4.5	920.	7.40
5/ 1/75	922.	0.0	26.5	5.1	980.	7.20
5/ 1/75	923.	1.5	26.5	4.7	970.	7.20
5/15/75	1330.	0.0	25.0	2.6	1950.	6.40

STATION = HBC-54.2 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
5/15/75	1332.	1.5	24.5	1.7	1990.	6.50
5/29/75	1253.	0.0	26.5	3.0	920.	7.00
5/29/75	1255.	1.5	26.0	1.6	980.	6.90
6/13/75	1320.	0.0	29.5	5.4	800.	7.10
6/13/75	1322.	1.5	27.2	0.6	1000.	6.80
6/26/75	1220.	0.0	24.9	3.8	1810.	7.30
6/26/75	1222.	1.5	24.0	1.5	1910.	7.30
7/11/75	1345.	0.0	25.5	0.3	1770.	6.80
7/11/75	1347.	1.0				
7/24/75	1430.	0.0	25.5	0.9	1540.	7.20
7/24/75	1435.	2.0	25.0	0.4	1620.	7.20

APPENDIX E. FIELD DATA FOR EACH SAMPLING DATE

3. North New River

STATION = NNR-00.0 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/11/74	1550.	0.0	27.9		515.	7.20
6/11/74	1550.	2.0	28.8		814.	7.30
6/28/74	1425.	0.0	26.7	3.3	755.	7.40
6/28/74	1425.	2.0				
7/12/74	1145.	0.0	28.3	3.0	650.	7.70
7/12/74	1145.	2.0	28.6	2.8	678.	7.90
8/ 6/74	1530.	2.0	27.2	3.5	610.	6.40
8/ 6/74	1535.	1.0	27.3	3.7	600.	6.40
8/20/74		0.0	27.5	1.8	630.	7.60
8/20/74		1.0	27.5	1.8	650.	7.70
9/ 5/74	1505.	0.0	28.0	2.8	775.	7.45
9/ 5/74	1500.	2.0	28.0	2.4	770.	7.50
9/17/74	1000.	0.0	26.0	3.5	740.	7.40
9/17/74	1010.	1.0	25.8	3.0	745.	7.40
10/ 3/74	1030.	0.0	26.0	3.8	700.	7.40
10/ 3/74	1035.	1.0	25.0	3.3	730.	7.40
10/17/74	1325.	0.0	25.4	3.8	730.	7.40
10/17/74	1335.	1.0	25.6	3.0	750.	7.40
10/29/74	1609.	0.0	23.0	3.0	640.	7.40
10/29/74	1605.	1.0	23.0	3.1	660.	7.50
11/13/74	1533.	0.0	20.5	7.3	710.	7.60
11/13/74	1537.	2.5	19.6	5.7	720.	7.70
11/26/74	1915.	0.0	20.6	3.8	730.	7.40
11/26/74	1925.	2.0	20.4	4.0	750.	7.40
12/18/74	1638.	0.0	20.0		685.	7.70
12/18/74	1640.	2.0	20.0		700.	7.70
1/ 5/75	1650.	0.0	23.0	3.0	910.	7.60
1/ 5/75	1700.	2.0	23.1	3.0	940.	7.60
1/22/75	1800.	0.0	22.6	6.0	640.	7.50
1/22/75	1730.	2.0	22.4	6.2	670.	7.80
2/18/75	1623.	0.0	23.5	7.8	605.	7.70
2/18/75	1625.	2.0	22.6	6.7	670.	7.60
3/ 5/75		0.0				
3/ 5/75		2.0				
3/20/75	1250.	0.0	24.0	3.0	790.	7.50
3/20/75	1330.	2.0	23.8	3.0	790.	7.50
4/ 3/75	1300.	0.0	25.5	4.0	450.	7.60
4/ 3/75	1345.	3.0	25.5	3.8	470.	7.60
4/17/75	1110.	0.0	25.2	7.3	1300.	7.80
4/17/75	1112.	2.0	25.1	5.2	1200.	7.70

STATION = NNR-00.0 CODE

DATE MO/DA/YR	TIME HOUR,MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
5/ 1/75	1255.	0.0	29.5	8.7	1130.	7.70
5/ 1/75	1257.	2.0	27.0	8.1	1130.	7.70
5/15/75	1036.	0.0	25.0	3.0	1900.	6.90
5/15/75	1030.	2.0	25.0	2.8	1990.	6.90
5/29/75	1024.	0.0	28.5	7.5	830.	7.30
5/29/75	1028.	2.0	28.0	7.6	820.	7.30
6/13/75	1013.	0.0	29.5	5.7	830.	7.10
6/13/75	1015.	1.5	29.4	5.0	830.	7.10
6/26/75	1030.	0.0	25.6	2.1	1480.	7.80
6/26/75	1032.	2.5	25.5	1.1	1770.	7.70
7/11/75	1120.	0.0	27.5	1.1	1750.	7.00
7/11/75	1122.	2.0				
7/24/75		0.0				
7/24/75		2.0				

STATION = NNR-05.8 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/11/74	1520.	0.0	28.6		605.	7.30
6/11/74	1520.	2.0	27.8		800.	7.40
6/28/74	1450.	0.0	26.0	3.6	621.	7.30
6/28/74	1450.	3.0	25.7	3.2	660.	7.50
7/12/74	1215.	0.0	27.3	0.9	720.	7.50
7/12/74	1215.	3.0	27.2	0.4	735.	7.60
8/ 6/74	1510.	0.0	26.7	3.1	500.	6.20
8/ 6/74	1515.	3.0	26.5	1.2	550.	6.30
8/20/74		2.0	26.5	0.6	570.	7.60
8/20/74		0.0	26.5	1.5	545.	7.50
9/ 5/74	1425.	0.0	27.5	3.4	560.	7.50
9/ 5/74	1420.	2.0	27.0	2.4	610.	7.50
9/17/74	1040.	0.0	26.2	4.0	600.	7.30
9/17/74	1050.	2.0	26.0	3.2	620.	7.40
10/ 3/74	1110.	0.0	25.5	4.0	620.	7.30
10/ 3/74	1115.	2.0	25.8	4.0	650.	7.40
10/17/74	1400.	0.0	25.4	4.0	600.	7.40
10/17/74	1420.	2.0	25.4	3.6	620.	7.40
10/29/74	1530.	0.0	24.5	1.5	390.	7.20
10/29/74	1540.	2.0	24.3	0.8	740.	7.40
11/13/74	1500.	0.0	21.4	2.4	495.	7.30
11/13/74	1510.	2.0	21.0	1.5	800.	7.40
11/26/74	1820.	0.0	20.3	3.6	600.	7.40
11/26/74	1825.	2.0	20.2	3.2	580.	7.40
12/18/74	1620.	0.0	20.0		300.	7.40
12/18/74	1625.	3.0	20.5		760.	7.60
1/ 5/75	1600.	0.0	23.0	4.6	650.	7.30
1/ 5/75	1610.	2.0	23.0	4.0	670.	7.20
1/22/75	1700.	0.0	22.9	7.1	610.	7.90
1/22/75	1650.	2.0	22.9	6.9	670.	7.90
2/18/75	1550.	0.0	25.0	3.9	510.	7.30
2/18/75	1560.	2.0	23.0	2.3	580.	7.20
3/ 5/75		0.0				
3/ 5/75		2.0				
3/20/75	1140.	0.0	24.5	4.6	720.	7.20
3/20/75	1210.	2.0	24.3	4.2	730.	7.20
4/ 3/75	1420.	0.0	25.0	4.5	390.	7.20
4/ 3/75	1425.	2.0	25.0	4.3	400.	7.20
4/17/75	1135.	0.0	25.5	5.3	1200.	7.60
4/17/75	1145.	2.0	25.5	4.8	1300.	7.60

STATION = NNR-05.8 CODE

DATE MO/DA/YR	TIME HOUR,MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
5/ 1/75	1341.	0.0	29.0	4.8	1140.	7.50
5/ 1/75	1343.	2.5	27.0	4.1	1140.	7.50
5/15/75	1115.	0.0	25.4	4.6	1470.	7.00
5/15/75	1117.	2.0	24.6	3.6	1689.	7.00
5/29/75	1156.	0.0	28.5	4.8	880.	7.20
5/29/75	1158.	2.5	26.5	1.2	750.	7.00
6/13/75	1043.	0.0	27.4	3.1	850.	6.90
6/13/75	1045.	2.5	27.0	0.6	840.	6.80
6/26/75	1100.	0.0	25.0	6.3	1330.	7.70
6/26/75	1102.	2.5	24.6	1.5	1780.	7.60
7/11/75	1145.	0.0	27.5		1770.	7.00
7/11/75	1148.	2.0				
7/24/75	1135.	0.0	25.0	6.8	1310.	8.60
7/24/75	1137.	2.5	25.0	0.7	1520.	8.20

STATION = NNR-09.0 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/11/74	1440.	0.0	27.4		571.	7.20
6/11/74	1440.	2.0	27.2		617.	7.20
6/28/74	1510.	0.0	25.6	4.3	533.	7.30
6/28/74	1510.	2.0	25.5	4.1	580.	7.30
7/12/74	1230.	0.0	28.1	4.0	883.	7.60
7/12/74	1230.	3.0	26.2	1.0	710.	7.60
8/ 6/74	1455.	0.0	27.5	6.9	390.	6.20
8/ 6/74	1500.	3.0	27.0	3.6	410.	6.40
8/20/74		0.0	26.0	3.4	300.	7.40
8/20/74		3.0	26.0	2.1	460.	7.50
9/ 5/74	1410.	0.0	26.5	3.5	540.	7.50
9/ 5/74	1405.	3.0	26.0	2.7	600.	7.60
9/17/74	1115.	0.0	26.5	3.8	530.	7.30
9/17/74	1120.	3.0	26.0	3.0	560.	7.40
10/ 3/74	1140.	0.0	26.3	3.9	550.	7.30
10/ 3/74	1145.	3.0	26.0	3.0	590.	7.50
10/17/74	1610.	0.0	24.9	3.4	580.	7.30
10/17/74	1605.	3.0	24.9	3.2	580.	7.30
10/29/74	1505.	0.0	23.5	2.2	780.	7.20
10/29/74	1510.	2.0	23.0	1.7	820.	7.40
11/13/74	1446.	0.0	21.0	3.9	780.	7.30
11/13/74	1448.	2.0	21.0	3.3	820.	7.50
11/26/74	1710.	0.0	21.0	3.1	600.	7.30
11/26/74	1720.	3.0	20.3	3.2	600.	7.30
12/18/74	1548.	0.0	21.0		790.	7.40
12/18/74	1549.	2.5	21.0		790.	7.60
1/ 5/75	1510.	0.0	23.0	2.5	680.	6.50
1/ 5/75	1520.	2.0	22.8	2.5	700.	6.80
1/22/75	1600.	0.0	23.0	6.1	690.	7.80
1/22/75	1540.	2.0	22.9	6.4	730.	7.80
2/18/75	1526.	0.0	25.0	2.3	870.	7.10
2/18/75	1529.	2.0	23.2	0.9	900.	7.10
3/ 5/75		0.0				
3/ 5/75		2.0				
3/20/75	1030.	0.0	24.0	2.5	700.	7.00
3/20/75	1050.	3.0	23.8	3.0	700.	6.80
4/ 3/75	1500.	0.0	25.5	4.8	410.	7.10
4/ 3/75	1510.	2.0	25.5	4.8	420.	7.00
4/17/75	1150.	0.0	25.0	5.2	1250.	7.60
4/17/75	1110.	2.0	24.5	4.7	130.	7.60

STATION = NNR-09.0 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
5/ 1/75	1319.	0.0	28.5	4.7	1140.	7.50
5/ 1/75	1321.	2.5	27.0	4.1	1140.	7.50
5/15/75	1141.	0.0	24.5	4.5	1420.	6.90
5/15/75	1144.	2.5	24.0	4.2	1610.	6.90
5/29/75	1142.	0.0	27.5	4.0	880.	7.10
5/29/75	1144.	2.5	27.0	3.2	910.	7.10
6/13/75	1105.	0.0	29.3	4.5	910.	6.90
6/13/75	1108.	2.5	26.5	1.5	870.	6.70
6/26/75	1115.	0.0	24.4	5.9	1420.	7.60
6/26/75	1117.	2.5	23.9	2.8	1710.	7.50
7/11/75	1215.	0.0	26.8	1.2	1730.	7.00
7/11/75	1218.	2.5				
7/24/75	1100.	0.0	25.6	7.0	1380.	10.50
7/24/75	1103.	2.0	25.1	1.9	1550.	10.20

APPENDIX E. FIELD DATA FOR EACH SAMPLING DATE

4. Tamiami Canal

STATION = TAM-06.5 CODE

DATE MO/DA/YR	TIME HOUR,MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/11/74	1315.	0.0	28.0		285.	7.70
6/11/74	1315.	2.0	27.5		350.	7.40
6/28/74	1245.	0.0	26.4	3.2	472.	7.60
6/28/74	1245.	2.0	26.2	3.5	520.	7.60
7/12/74	1515.	0.0	27.7	0.8	550.	7.30
7/12/74	1515.	2.0	27.5	0.7	530.	7.50
8/ 6/74	1100.	0.0	25.5	2.4	290.	6.90
8/ 6/74	1100.	2.0	25.5	2.0	290.	6.90
9/ 5/74	840.	0.0	25.5	0.6	555.	7.35
9/ 5/74	845.	2.0	25.5	0.5	560.	7.35
9/10/74	515.	0.0				
9/17/74	1310.	0.0	26.4	3.5	450.	7.60
9/17/74	1320.	2.0	26.3	3.0	460.	7.70
10/ 3/74	1230.	0.0	25.5	3.6	480.	7.60
10/ 3/74	1240.	2.0	26.2	3.1	500.	7.70
10/17/74	1030.	0.0	24.8	3.6	490.	7.50
10/17/74	1040.	2.0	24.8	3.1	430.	7.70
10/29/74	1124.	0.0	23.5	0.4	340.	7.45
10/29/74	1134.	2.0	23.2	0.7	380.	7.82
11/13/74	1200.	0.0	21.5	1.5	512.	7.20
11/13/74	1203.	2.0	21.5	1.5	529.	7.30
11/26/74	1635.	0.0	21.0	3.8	610.	7.50
11/26/74	1650.	2.0	21.1	3.2	450.	7.60
12/18/74	1500.	0.0	21.0		290.	7.30
12/18/74	1505.	2.0	18.0		720.	7.30
1/ 5/75	1350.	0.0	22.3	4.5	780.	7.10
1/ 5/75	1400.	2.0	22.0	4.6	800.	7.20
1/22/75	1300.	0.0	23.1	3.0	600.	7.70
1/22/75	1310.	2.0	23.1	2.8	615.	7.40
2/18/75	4450.	0.0	24.0	1.6	420.	7.20
2/18/75	1450.	2.0	22.5	2.7	490.	7.30
3/ 5/75		0.0				
3/ 5/75		2.0				
3/19/75	1251.	0.0	25.0	7.2	710.	7.00
3/19/75	1252.	2.0	25.0	6.9	720.	7.00
4/ 2/75	1200.	0.0	25.1	9.8	300.	7.10
4/ 2/75	1220.	3.0	25.0	7.6	350.	7.20
4/16/75	1230.	0.0	24.3	9.0	600.	7.10
4/16/75	1245.	3.0	24.0	8.5	640.	7.10
4/30/75	1100.	0.0	26.5	5.6	730.	7.40

STATION = TAM-66.5 CODE

DATE MO/DY/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
4/30/75	1110.	2.0	26.4	5.3	730.	7.40
5/14/75	1106.	0.0	25.5	4.3	1310.	6.20
5/14/75	1109.	2.0	25.0	3.4	1370.	6.20
5/28/75	1113.	0.0	27.5	4.2	560.	7.50
5/28/75	1115.	2.0	27.0	3.2	570.	7.60
6/12/75	1200.	0.0	27.5	3.0	585.	7.00
6/12/75	1202.	3.0	27.0	1.4	600.	7.00
6/25/75	1349.	0.0	28.3	2.4	59.	6.90
6/25/75	1351.	2.0	27.9	1.9	580.	6.90
7/10/75		0.0				
7/10/75		0.0				
7/23/75	1210.	0.0	25.4	2.9	1470.	7.80
7/23/75	1212.	2.0	25.4	2.6	1510.	7.80

STATION = TAM-10.8 CODE

DATE MO/DA/YR	TIME HOUR,MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	pH
6/11/74	1225.	0.0	26.5		310.	7.00
6/11/74	1225.	2.0	25.7		370.	7.20
6/28/74	1200.	0.0	25.5	1.5	380.	7.60
6/28/74	1200.	2.0	25.3	0.3	420.	
7/12/74	1345.	0.0	25.5	0.4	569.	7.30
7/12/74	1345.	3.0	25.5	0.4	569.	7.40
8/ 6/74	1340.	0.0	25.5	5.4	380.	6.10
8/ 6/74	1345.	3.0	25.5	1.0	420.	6.30
9/ 5/74	900.	0.0	25.5	0.8	550.	7.35
9/ 5/74	855.	2.0	25.0	0.2	545.	7.35
9/17/74	1350.	0.0	26.8	2.0	400.	7.60
9/17/74	1400.	3.0	26.7	1.0	450.	7.60
10/ 3/74	1340.	0.0	26.0	2.4	420.	7.50
10/ 3/74	1345.	3.0	26.0	1.8	450.	7.50
10/17/74	1120.	0.0	24.6	2.8	420.	7.50
10/17/74	1130.	3.0	24.6	1.0	470.	7.50
10/29/74	1207.	0.0	23.2	0.8	320.	7.10
10/29/74	1220.	2.0	23.0	0.8	360.	7.50
11/13/74	1245.	0.0	22.0	1.6	300.	7.10
11/13/74	1250.	2.0	21.8	0.8	370.	7.20
11/26/74	1530.	0.0	20.8	2.8	460.	7.50
11/26/74	1545.	2.0	20.8	1.5	480.	7.50
12/18/74	1344.	0.0	22.2	0.7	520.	7.10
12/18/74	1346.	2.5	22.0	0.7	535.	7.30
1/ 5/75	1300.	0.0	21.8	4.0	700.	7.00
1/ 5/75	1310.	2.0	21.8	3.5	710.	7.10
1/22/75	1130.	0.0	22.5	5.0	610.	7.30
1/22/75	1120.	2.0	22.4	4.8	620.	7.20
2/18/75	1400.	0.0	25.0	4.5	300.	7.10
2/18/75	1415.	2.0	24.0	3.2	350.	7.00
3/ 5/75		0.0				
3/ 5/75		2.0				
3/19/75	1320.	0.0	25.0	4.2	540.	7.00
3/19/75	1325.	2.0	24.5	3.4	540.	6.80
4/ 2/75	1415.	0.0	25.0	9.4	480.	7.20
4/ 2/75	1430.	2.0	24.8	7.1	490.	7.20
4/16/75	1320.	0.0	24.5	8.7	510.	7.10
4/16/75	1340.	2.0	24.5	8.0	550.	7.10
4/30/75	1300.	0.0	26.5	2.9	640.	7.20
4/30/75	1315.	2.0	26.5	1.0	640.	7.20

STATION = TAM-10.8 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
5/14/75	1440.	0.0	24.0	1.5	1330.	5.70
5/14/75	1442.	2.0	23.8	1.4	1420.	5.80
5/28/75	1405.	0.0	25.6	1.8	660.	7.60
5/28/75	1415.	3.0	25.5	1.6	660.	7.60
6/12/75	1530.	0.0	26.5	1.1	610.	6.90
6/12/75	1531.	2.0	26.0	0.9	610.	6.90
6/25/75	1505.	0.0	25.6	1.1	630.	6.90
6/25/75	1507.	2.0	25.6	0.9	630.	6.90
7/10/75		0.0				
7/10/75		0.0				
7/23/75		0.0	24.0	1.3		7.40
7/23/75		2.0	23.9	1.2		7.30

STATION = TAM-16.0 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/11/74	1120.	0.0	26.5		488.	7.40
6/11/74	1120.	3.0	26.0		510.	7.40
6/28/74	1145.	0.0	26.5	6.2	430.	7.90
6/28/74	1145.	2.0	26.0	5.6	493.	
7/12/74	1330.	0.0	29.5	5.3	642.	8.00
7/12/74	1330.	4.0	25.6	0.4	655.	7.70
8/ 6/74	1400.	0.0	29.5	5.0	240.	6.40
8/ 6/74	1405.	3.0	25.7	0.4	400.	6.30
8/20/74		0.0	27.0	3.1	380.	7.50
8/20/74		3.0	27.0	0.5	410.	7.60
9/ 5/74	950.	0.0	28.0	2.9	350.	7.40
9/ 5/74	945.	3.0	26.0	0.1	460.	7.40
9/17/74	1540.	0.0	26.0	6.0	430.	7.80
9/17/74	1550.	2.0	26.0	6.0	430.	7.90
10/ 3/74	1530.	0.0	26.1	6.0	450.	7.50
10/ 3/74	1540.	2.0	26.0	5.5	460.	7.60
10/17/74	1350.	0.0	24.8	6.1	460.	7.70
10/17/74	1400.	2.0	24.7	6.0	470.	7.80
10/29/74	1407.	0.0	25.2	1.9	470.	7.30
10/29/74	1410.	3.0	23.2	0.9	520.	7.40
11/13/74	1400.	0.0	22.5	1.6	520.	7.20
11/13/74	1402.	0.0	22.5	2.2	560.	7.60
11/26/74	1240.	0.0	20.9	6.2	480.	7.70
11/26/74	1255.	2.0	20.9	6.0	500.	7.80
12/18/74	1250.	0.0	22.5	1.4	540.	7.20
12/18/74	1255.	2.0	22.0	1.4	540.	7.50
1/ 5/75	1100.	0.0	22.0	4.7	650.	7.60
1/ 5/75	1110.	2.0	21.8	4.0	690.	7.60
1/22/75	1000.	0.0	22.2	5.0	470.	7.60
1/22/75	950.	2.0	22.0	4.8	490.	7.70
2/18/75	1330.	0.0	24.4	4.9	470.	7.20
2/18/75	1340.	2.0	24.2	4.1	520.	7.20
3/ 5/75		0.0				
3/ 5/75		2.0				
3/19/75	1447.	0.0	24.0	2.8	650.	7.00
3/19/75	1449.	3.0	23.0	0.2	660.	6.90
4/ 2/75	1500.	0.0	25.6	8.3	350.	7.10
4/ 2/75	1510.	3.0	25.1	7.0	390.	7.10
4/16/75	1540.	0.0	24.5	7.0	500.	7.20
4/16/75	1550.	3.0	24.0	4.0	570.	7.10

STATION = TAM-15.2 CODE

DATE MO/DA/YR	TIME HOUR.MTN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
4/30/75	1315.	0.0	27.5	4.9	760.	7.40
4/30/75	1317.	2.5	26.4	4.3	760.	7.30
5/14/75	1501.	0.0	25.5	4.2	1350.	5.80
5/14/75	1502.	3.0	24.0	2.5	1540.	5.80
5/28/75	1425.	0.0	27.3	5.2	720.	7.90
5/28/75	1427.	3.0	27.0	4.7	720.	7.90
6/12/75	1520.	0.0	29.5	5.8	750.	7.40
6/12/75	1525.	2.0	26.5	0.5	750.	7.20
6/25/75	1530.	0.0	29.5	7.0	740.	7.40
6/25/75	1540.	3.0	25.5	0.2	740.	7.00
7/10/75		0.0				
7/10/75		0.0				
7/23/75	1503.	0.0	27.4	4.9	1360.	7.40
7/23/75	1505.	3.5	24.3	0.3	1440.	7.00

5. Snapper Creek

STATION = TSC-S3.5 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
6/11/74	1205.	0.0	26.6		268.	7.10
6/11/74	1205.	3.0	26.5		361.	7.30
6/28/74	1215.	0.0	26.2	2.1	485.	7.60
6/28/74	1215.	3.0	25.5	1.7	510.	
7/12/74	1400.	0.0	27.0	0.7	382.	7.30
7/12/74	1400.	3.0	26.0	0.3	421.	7.50
8/ 6/74	1000.	0.0	25.3	1.0	330.	6.20
8/ 6/74	1000.	3.0	25.3	0.8	360.	6.40
8/20/74		0.0	26.0	0.7	395.	7.30
8/20/74		2.0	26.0	0.5	430.	7.50
9/ 5/74	930.	0.0	26.5	0.9	320.	7.40
9/ 5/74	925.	3.0	26.0	0.5	390.	7.50
9/17/74	1420.	0.0	26.5	2.5	490.	7.60
9/17/74	1430.	3.0	26.3	2.0	510.	7.60
10/ 3/74	1430.	0.0	25.8	2.8	510.	7.60
10/ 3/74	1440.	3.0	25.8	2.6	540.	7.60
10/17/74	1215.	0.0	24.7	2.7	510.	7.60
10/17/74	1225.	3.0	24.6	2.3	520.	7.60
10/29/74	1145.	0.0	23.4	2.1	270.	7.20
10/29/74	1155.	1.0	23.0	1.5	460.	7.60
11/13/74	1230.	0.0	22.2	1.5	340.	7.10
11/13/74	1235.	2.0	21.8	1.2	370.	7.10
11/26/74	1410.	0.0	21.0	2.8	500.	7.60
11/26/74	1420.	3.0	21.0	2.3	520.	7.60
12/18/74	1320.	0.0	22.0	2.5	380.	7.10
12/18/74	1330.	2.0	22.0	1.9	420.	7.40
1/ 5/75	1200.	0.0	21.5	2.6	750.	7.20
1/ 5/75	1210.	2.0	21.5	2.0	780.	7.40
1/22/75	1100.	0.0	22.4	6.0	700.	7.10
1/22/75	1150.	2.0	22.4	6.2	710.	7.40
2/18/75	1430.	0.0	23.6	1.9	390.	7.10
2/18/75	1432.	2.0	23.4	1.4	448.	7.00
3/ 5/75		0.0				
3/ 5/75		2.0				
3/19/75	1331.	0.0	24.0	2.3	560.	6.80
3/19/75	1332.	2.0	24.0	1.7	560.	6.80
4/ 2/75	1320.	0.0	25.5	9.6	370.	7.30
4/ 2/75	1330.	3.0	25.0	7.0	380.	7.30
4/16/75	1450.	0.0	24.5	8.3	430.	7.20
4/16/75	1500.	3.0	24.5	4.5	460.	7.10

STATION = TSC-53.5 CODE

DATE MO/DA/YR	TIME HOUR.MIN	DEPTH METERS	TEMP CENT	D.O. MG/L	SP COND UMHOS/CM	PH
4/30/75	1234.	0.0	26.5	5.1	570.	7.30
4/30/75	1236.	2.0	26.0	4.3	570.	7.20
5/14/75	1135.	0.0	23.8	3.0	1270.	6.20
5/14/75	1137.	2.0	23.5	2.4	1340.	6.20
5/28/75	1339.	0.0	26.5	3.0	600.	7.70
5/28/75	1340.	2.0	26.3	1.6	610.	7.60
6/12/75	1230.	0.0	27.7	7.2	590.	7.20
6/12/75	1232.	2.0	26.0	0.3	610.	7.00
6/25/75	1415.	0.0	27.0	5.0	590.	7.10
6/25/75	1420.	2.0	25.5	1.0	590.	7.10
7/10/75		0.0				
7/10/75		0.0				
7/23/75		0.0	25.6	3.0	1330.	7.40
7/23/75		2.0	23.8	0.6	1390.	7.30