SALINE VALLEY RURAL CLEAN WATER PROJECT

INTERIM REPORT ON MONITORING

DURING 1988

by

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INTRODUCTION

This interim report includes results of the monitoring of eight stations on waterways in the Saline Valley Rural Clean Water Project. These stations are on the Saline River or its tributaries. The data are for January 6, 1988- December 21, 1988.

This report follows the format of last year's report (Holland et al., 1988). It includes all results of analyses for pH, conductivity, suspended solids, ammonia nitrogen, nitrate nitrogen, soluble reactive phosphorus, available phosphorus, total phosphorus, silica, chloride, discharge, and temperature for each sampling date. Data on seasonal and annual loadings for each station are also included.

We also include data on the chemistry of groundwater in wells near animal waste holding facilities, from sampling on March 23, 1988 and December 1, 1988.

Land inventory data and water sample collection were provided by Dennis Rice and associated staff of the Washtenaw County Soil Conservation District.

MONITORING AND EVALUATION DATA

Monitoring Strategy

A monitoring program has been established to evaluate the effectiveness of installed Best Management Practices (BMPs) by monitoring the chemical loading of project area streams. The Washtenaw County Soil Conservation District and the Monroe County Soil and Water Conservation District coordinate the responsibilities of determining Best Management Practice application progress and generally documenting water quality trends. The Local Coordinating Committee - Monitoring Subcommittee includes representatives from the Michigan Department of Natural Resources, the Michigan Department of Agriculture, Huron River Watershed Council, Southeast Michigan Council of governments, USDA-SCS, ASCS, ERS, and local citizens.

In order to realize the stated objectives of the monitoring program, it was necessary to either define the water quality situation from an existing data base or obtain enough new data to establish baseline conditions prior to implementation of Best Management Practices. The data base was either nonexistent or inadequate, so the first year of this program was directed primarily at determining baseline conditions. For some sampling sites, this was possible, as no BMPs had been implemented in the watershed. For others, some BMPs had been implemented, but these data, while not strictly baseline, nevertheless allow trend analyses. Sampling sites were selected to avoid point source pollution impacts, except for station 8 at the mouth of the Saline River.

Sampling sites are situated in order to determine trends in water quality in the the Saline Valley. Eight sampling stations were established in 1981 and included five small drainage basins as well as the Saline River. Two of these stations (1 and 2), located in the Huron River watershed, were discontinued in 1985. Station 9 (Macon Creek) was added on June 21, 1982. Station 3A on the Saline River was established in 1984 (Fig. 1).

Only by establishing baseline data and by subsequent monitoring will we be able to determine whether best management farming practices* have improved water quality in the project area. Evaluations of nonpoint pollution control programs must consider variability of flows and loads over the long term. In other words, we must know the natural variance in order to detect any trends.

SAMPLING STATIONS

Saline-Bridgewater Drain - Station 3

The watershed of the Saline-Bridgewater Drain is located in Saline and Bridgewater Townships in Washtenaw County. It is 3,969 acres in size with 435 acres of woodland. No municipal or industrial point source pollution exists, and urbanization is not expected to occur in this watershed. Land use is a mixture of row cropping and livestock operations, hence monitoring at Feldkamp Road will provide information on water quality changes as a result of BMPs for these land uses. The Saline-Bridgewater Drain flows into the Saline River at Feldkamp Road. This Drain

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* Best management practices installed in 1980, for the stations described below, are listed in Appendix G.

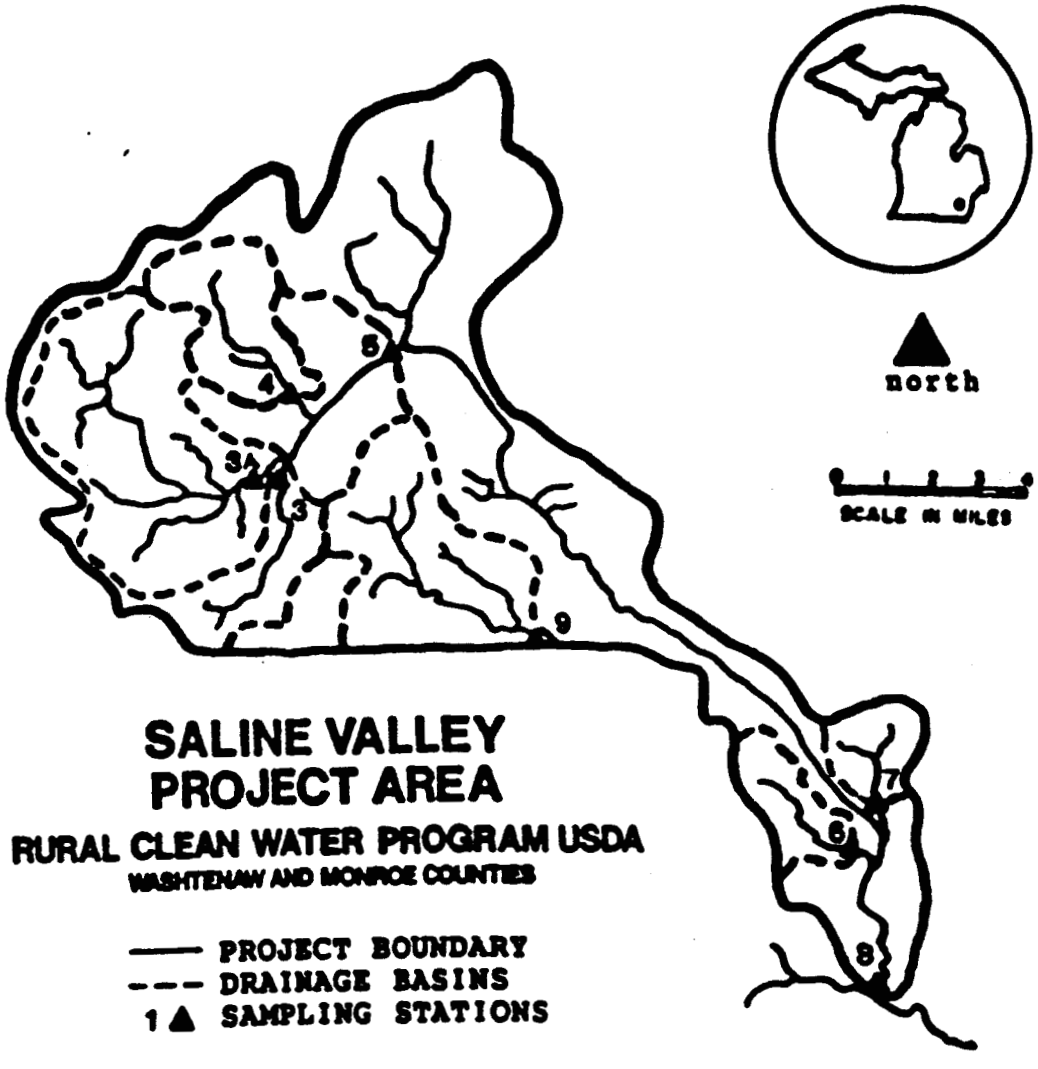

FIG 1. The Saline Valley RCWP study area. Covers 77,000 acres and is located in Washtenaw and Monroe Counties, MI.

was dredged in June 1983, and the staff gauge was lost. Subsequently, a new hydrograph has been established and water level is now measured from the top of the culvert pipe to the water surface.

Upstream of the Confluence of the Saline Bridgewater Drains - Station 3A on Saline River

Just north of the confluence of the Saline and Bridgewater drains (station 3) is station 3A, established in October of 1984. This watershed comprises 14,010 acres, three lakes, three major drains, row crops, and dairy operations. There is no hydrograph for station 3A. Because stations 3 and 4 drain into the Saline River before station 5, the flow value for station 3A is calculated by subtracting the sum of the values of flow for stations 3 and 4 from the value of flow for station 5.

Bauer Drain - Station 4

The 4,900 acre watershed of Bauer Drain is located in Saline, Lodi and Freedom Townships in Washtenaw County; there is a combination of row crops, meadow crops, and woodland or idle land. No urbanizing or point source influences occur in this watershed. Bauer Drain flows into the Saline River just east of Austin Road. A staff gauge was installed by the USGS in 1981.

Saline River at Dell Road - Station 5

USGS currently monitors the Saline River at Dell Road. The staff gauge installed by the USGS in 1981 was lost in February 1985; subsequently, water level was measured from the bridge.

Station 5 at Dell Road is just downstream from where Bauer Drain enters the Saline River. Data from this station reflect conditions upstream including stations 3, 3A, and 4. The additional watershed between 3A and 5 is 6,240 acres.

Bear Creek - Station 6

The 2,470 acre watershed of Bear Creek is located in Milan and London Townships in Monroe County. Water quality data collected at Wells Road (Station 6) will identify changes that occur from the establishment of BMPs to control cropland erosion and wind erosion. The station does not have a staff gauge and water level is measured from the bridge to the water surface.

Wanty Drain - Station 7

The 1,920 acre watershed of Wanty Drain is located in London Township in Monroe County. Acreage is wooded, brush, open fields, cropland, or residential. The sampling station (Station 7) is located at Plank Road, which is above most of the residential area. Urban nonpoint source pollution should not be significant above Plank Road. Cash cropping is predominant with fall plowing where the residue is returned to the soil. Soils are either fine sands or muck; therefore, the water quality monitoring should provide information on the influence of BMP establishment to control cash cropping and wind erosion. A staff gauge was installed by the USGS in 1981.

Saline River at Mouth - Station 8

Station 8 is the Saline River as it flows into the Raisin River. Station 8 is located at Bigelow Road in Dundee Township,

Monroe County. Samples from this station should represent water quality changes that occur from establishment of BMPs in the 128 square mile Saline River Watershed (81,920 acres). Interference from municipal and industrial point sources and urban nonpoint sources have to be accounted for in the analysis of these water quality data. This station does not have a staff gauge; water level is measured from the bridge at Bigelow Road.

North Macon Creek at Ridge Road - Station 9

Station 9 is located at the bridge of Ridge Highway one mile south of Nikona Road in Section 31 of York Township. This station monitors flow from the Macon Watershed which totals 9,728 acres. About 4,900 acres of the watershed is critical cropland. The sampling site is directly below the bridge. A staff gauge was located on the downstream (east) side of the bridge. The staff gauge was lost during 1984, but water level measurements have been made from the bridge.

DATA COLLECTION SCHEDULE

The plan has been to collect water samples weekly, but with the provision that the schedule could and should be adjusted to include sampling during periods around storms and times of snowmelt. Consequently, sampling events might occur twice or more in one week and might be eliminated during dry weather weeks.

IDENTIFICATION OF PARAMETERS BEING MONITORED

Flow (Discharge)

Suspended Solids

Orthophosphate (Soluble Reactive Phosphorus)

Available Phosphorus (Labile)

Total Phosphorus

Ammonia-N

Nitrate-N

Chloride

Conductivity

pH

Silica

Temperature

COLLECTION AND ANALYTICAL METHODS

Water samples were collected with a bucket at midstream immediately below the surface. Such sampling can be conducted from bridges at all sampling sites except during periods of very low flow, or ice cover when it is necessary to enter the streams to chop a hole in the ice and fill a sample bottle directly. The water samples were poured into chemically clean polyethylene bottles and delivered to the University laboratory the day of collection.

Temperatures were measured in situ with a mercury stem thermometer.

The U.S. Geological Survey measured stream flows, established staff gauges and reference points, and constructed hydrographs for the eight stations under contract with SEMCOG in 1981 and 1982. USGS personnel calculated flows and provided these data until the termination of their contract in March 1982.

Subsequently, University personnel have calculated flow from the hydrographs provided by USGS.

The staff gauge was lost for Station 3 when the County Drain Commission dredged Saline-Bridgewater Drain June 27, 1983. Stream flow was measured at this station and the new Station 9 to establish hydrographs for these sampling points. Flow measurements were completed in fall 1984. The staff gauge was lost for station 5, but flows had been measured from the bridge as well as the gauge. Measurements have continued from the bridge.

The height of water level on the staff gauges and/or the water level as measured from a reference point on a bridge were observed and recorded at each sampling event for each station.

Standard methods were used to determine pH, suspended solids, and conductivity on the samples soon after they were delivered to the laboratory. All other chemical analyses were made on an Auto Analyzer II system. Available phosphorus (AVP) was determined on the Auto Analyzer after a NaOH extraction of material retained on a 0.45-μm filter. This form of phosphorus is considered labile phosphate which can be used by algae (Martin, DePinto, Young 1984). It is assumed to be rapidly available. Ammonia-N determination followed the methods established by EPA (1976). Analyses for other chemicals followed the procedures presented by Davis and Simmons (1979).

All chemistry results were entered into a computer data bank. The computer readout provided weekly reports of calculated

discharge, temperature, and water chemistry results for all the stations (Appendices A, B and C).

Loadings were recalculated from those reported in the previous project report. Loading calculations were performed by multiplying the concentration of the particular measurement of interest by the flow, times the interval of the sampling period. The resultant values were summed to obtain estimates of seasonal loadings for the individual rivers (Appendix D). Annual loadings are given in Appendix E.

SUMMARY OF DATA

Data from station 8 at the mouth of the Saline River are discussed, even though chemical conditions at this station are influenced by discharge from the Milan Sewage Treatment Plant and other urban discharges. Indeed, the striking effect which the Milan Sewage Treatment Plant upgrade has had upon the reduction of phosphorus concentrations at station 8 is significant and instructive.

Analyses of well water were made twice in 1988 to test groundwater near animal waste holding tanks. Chemical data for well studies are given in appendix F.

Since discharge (flow) may greatly affect concentrations of the chemical constituents, the relationship of discharge to each constituent is explored.

Discharge (Flow)

Discharge followed a bimodal pattern at all station with winter/spring and autumnal peaks, and depressed flow during the

summer. Flow essentially ceased at stations 4 and 6 during this unusually dry and hot summer and also registered between 0.001 and 0.002 m3/sec at times at stations 3, 7, and 9.

Suspended Solids

Highest peaks of suspended solids coincided with greatest discharge except at stations 7 and 8; i.e., highest levels of suspended solids were found in November, except at station 7 where they were greatest in July, and at station 8 where they were highest in June. Values ranged from a low of 0.5 mg/l at station 7 to a maximum of 748 mg/l at station 3.

Soluble Reactive Phosphorus (SRP)

Fluctuation patterns of soluble reactive phosphorus were very similar at stations 3, 3a, and 4, where there were peaks in January and November and depressed concentrations throughout the rest of the year; these peaks coincided with peaks in discharge at stations 3a and 4. Stations 5 and 6 had high levels of SRP in parts of late summer and early autumn as well as in January and November, and these August and early fall increases occurred when discharge was low. Concentrations of SRP were low at station 7 until August when they rose to 127 µg/l although discharge was minimal; the year's highest level, 310 µg/l, was observed in September when discharge was still low. Levels were elevated in November when discharge was high. The greatest concentration of SRP (111 µg/l) at station 8 was observed in January when discharge was also highest; there were significant secondary

peaks in June, September and November. Concentrations did not fall below 8 µg/l at any time during the year. The highest concentration of SRP for any of our stations was found at station 9 in January, and measured 1170 µg/l. This high was correlated with increased discharge. The elevated SRP concentration in December likewise coincided with elevated discharge, but high concentrations from May through August were found when discharge was very low.

Available Phosphorus

The pattern of concentration of available phosphorus was similar at stations 3, 3a, 4, and 5, where there were minor increases in late winter and spring, depressed levels in early summer, and highest concentrations in November, when values ranged between 36 µg/l (station 3) and 52 µg/l (station 5). The November highs coincided with high discharge. Available phosphorus concentrations were low for most of the year at stations 6 and 7 with greatest values in November and September respectively. The September value of 154 µg/l at station 7 was the highest observed at any station; levels of available phosphorus here were inversely correlated with discharge. At station 8, available phosphorus fluctuated between 6 and 35 µg/l throughout the year with no apparent correlation to discharge. Although there were minor peaks of available phosphorus in January and November at station 9, which coincided with high discharge, the greatest concentration (121 µg/l) was observed in June when flow had almost ceased.

Total Phosphorus

Patterns of total phosphorus concentrations were similar at stations 3, 3a, and 4 with highest values in January and November; levels did not fall below 10 µg/l and reached a high of 380 µg/l at station 4. Highest levels coincided with increased flow. Peak levels of total phosphorus at station 5 in January and November coincided with elevated discharge, but the peak in September did not, nor did the greatest concentration (278 µg/l) in November. Total phosphorus concentration peaked at station 6 in January and November (290 µg/l) when discharge was also elevated, but it also peaked during the summer when there was essentially no flow; the full extent of the summer peak is not known since measurements were not made in June and July. Concentrations of total phosphorus were high at station 7 in August and highest in September; at both times discharge was very low. Total phosphorus concentrations at station 8 fluctuated between 38 and 257 µg/l and were generally inversely proportional to flow; levels were more constant than at the other stations. Total phosphorus concentrations were higher at station 9 (2000 µg/l in January) than at any other station. There were secondary peaks in summer (when flow had essentially stopped) and in November. The winter and fall increases coincided with high discharge.

Ammonia Nitrogen

Patterns of ammonia-N concentration were similar at stations 3a and 4 where highest levels were in January (362 µg/l and 202

µg/l respectively), when discharge was also high. Station 3 had peaks in January, April, May (433 µg/l), November and December; all but the January and December peaks occurred when flow was low. Ammonia concentrations at station 5 peaked in January and August (388 µg/l). The August peak occurred when discharge was very low. Ammonia concentrations at station 6 were low throughout the period of observation (which excluded June, July and half of August), and ranged between 13 and 62 µg/l. Ammonia levels at station 7 were low (below 140 µg/l) for most of the year except in August when flow was low and they reached 624 µg/l. The concentration of ammonia reached a high of 510 µg/l in January and was below 100 µg/l from April through December at station 8.

Ammonia concentrations at station 9 exceeded those of any other station with a mean value of 365.6 µg/l and a maximum value of 5748 µg/l in January (when discharge was high). They were again high in mid-summer (1107 µg/l and 930 µg/l) when discharge was very low.

Nitrate Nitrogen

Patterns of nitrate nitrogen concentration were similar at stations 3, 3a, 4, 5, and 8, where values ranged between 3.75 and 7.19 mg/l in January, declined to very low summer values and rose again to highest levels in autumn as discharge also increased. Patterns of concentration were likewise similar at stations 6, 7, and 9 where levels were also depressed during the summer, but levels in January were notably higher than at the aforementioned

stations, ranging from 11.62 to 12.84 mg/l. Highest values for these stations were all observed in November: 15 mg/l (station 6), 29 mg/l (station 7), and 18 mg/l (station 9).Station 7 had the highest mean value of nitrate nitrogen at 9.8 mg/l, very close to the maximum allowable level of 10 mg/l recommended by the National Academy of Sciences for consumption by infants (1978). The only station where the recommended level was not exceeded at some time was station 5.

Chloride

Patterns of chloride concentration were similar at stations 3, 3a, 4 and 5 where levels were fairly steady for most of the year and ranged between 13 and 50 mg/l with lowest values in November. Chloride levels were higher at the other stations with distinct peaks in spring and autumn at station 6 (highest value 153 mg/l), in summer at station 7 (maximum value 100 mg/l), in summer and autumn at station 8 (highest value 118 mg/l), and in summer at station 9 (maximum value 80 mg/l). In general, chloride concentrations varied inversely with discharge.

Conductivity

Conductivity was highest in summer or autumn at all stations, and in general, was inversely proportional to discharge.

Highs at stations 3, 3a, 4, 5, and 8 were around 1000 µmhos. At stations 7 and 9, maximum concentrations were lower reaching 920 µmhos and 880 umhos respectively in November. Conductivity

values at station 6 exceeded those of other stations, reaching 1720 µmhos in November.

pH

pH tended to be lowest when discharge was highest. Its range was slightly higher at stations 8 and 9 than at other stations (between 7.4 and 8.2 µmhos). Otherwise, the range was between 7.0 (lows at stations 3 and 3a), and 8.0 (highs at stations 6 and 7).

Silica

Patterns of silica concentration were similar for stations 3, 3a, 4, and 5 with sustained elevations from late spring through October and highest values reaching 14 mg/l (3a and 5) and 15 mg/l (3 and 4); minimum values ranged between 2.5 and 4.8 mg/l. Concentrations of silica observed at stations 6 and 7 were low until June and highest in summer and early autumn; levels ranged from 0.2 to 39 mg/l. At both stations 8 and 9, silica values were lowest in April (1.7 and 0.5 mg/l respectively) and highest in July (13 and 20 mg/l respectively). In general, there was an inverse correlation between concentrations of silica and discharge at all stations.

Temperature

Temperature at station 3 ranged between 35 and 66° F throughout the year. Winter temperatures at all other stations fell to freezing or below in winter and reached as high as 80°

(station 4) in summer. Patterns were similar to air temperature for a north temperate climate, with highest values in summer and lowest levels in winter.

Seasonal Loadings

Seasonal loading of most constituents was greatest in autumn (September-November); however, loading of chloride was highest at all stations in winter (December-February). The loading of all constituents was highest in winter at station 8, and the loading of all constituents except suspended solids was highest in winter at station 9. Loading was not optimal for any constituent at any station in spring or summer.

Annual Loadings

This year, again, the annual loading of all constituents was highest at the stations with greatest discharge: respectively, station 8, station 5, and station 3a.

CHEMISTRY OF GROUNDWATER NEAR ANIMAL WASTE HOLDING FACILITIES

In March, and again in December, we sampled wells drilled several years ago to test groundwater around three animal waste holding tanks (wells ABC, DEF, and GHI), and from an older existing well near each of the tanks (wells JKL). Values of pH, conductivity, ammonia-N, nitrate-N, soluble reactive phosphorus, silica, chloride, water elevation, and temperature are given in appendix F.

Soluble reactive phosphorus concentrations were again highest at wells B, C, I, and L, but for the second consecutive year showed significantly decreased values. In September of 1986, levels of SRP reached four digit levels at wells C and I. In 1987, highest concentrations at these wells were 763 µg/l and 736 µg/l respectively. Highest values observed there in 1988 were 263 µg/l and 330 µg/l respectively. The greatest concentrations observed at stations B and L were 91 µg/l and 208 µg/l, respectively.

Ammonia reached extremely high concentrations at well E (40,000 µg/l in December and 46,000 µg/l in March). These values by far eclipsed those at well L which had the next highest values (maximum concentration of 905 µg/l in March). Values at other wells ranged from 12 µg/l (well A in March) to 316 µg/l (well J in March).

Chloride concentrations were highest on both sampling dates at wells A and D (highest values for both wells were observed in March and were 309.6 and 267.3 µg/l respectively). Chloride levels at other wells ranged from 2.7 µg/l (well F in December) to 254.6 µg/l (well G in March).

Nitrate-N concentrations were again highest at well B (13.27 mg/l in December and 16.79 mg/l in March). On both sampling dates, the observed values exceeded the 10 mg/l level recommended for ingestion by infants (National Research Council, 1978). Values from other wells ranged from 0.07 mg/l (wells E, J, K, and L in December) to 3.07 mg/l at well A in March.

DISCUSSION

There were increases in the mean concentrations of all chemical parameters except chloride at most stations between 1987 and 1988. There was also increased discharge at all stations between these years due primarily to higher flow during the winter and autumn of 1988. The higher chemical concentrations of the second year were probably caused by increased leaching and increased contributions from airborne chemicals entering the waterways through precipitation. The decreased mean chloride concentrations at stations 3, 4, 5, and 9 reverse an upward trend observed in previous years.

The increase in all forms of phosphorus at station 9 was striking. Mean values of total phosphorus rose from 84.0 µg/l to 198.1 µg/l; SRP rose from 34 µg/l to 100.5 µg/l; and AVP rose from 10.0 µg/l to 18.9 µg/l. The increase of ammonia-nitrogen at this station is even more striking, from 39.0 µg/l to 365.6 µg/l. Maximum values of total P, SRP, and ammonia-N reached four figures, with respective values of 2000 µg/l, 1169 µg/l, and 5748 µg/l. Best management practices in the vicinity of this station are not evidenced by our data; on the contrary, our data indicate that the drainage into this station was a serious source of pollution in 1988.

Mean concentrations of NH_3-N, SRP, AVP, and Cl decreased at station 8. The increase in mean concentration of total P was slight, from 140.0 µg/l to 143.8 µg/l. Nitrate-N rose from 2.98 mg/l to 3.8 mg/l. The decline in mean concentrations of four

chemical constituents, esp. SRP and AVP, and the negligible increase in total P at station 8 attest again to the effectiveness of the Milan sewage treatment plant.

This effectiveness is illustrated in table 1 which compares the pre and post sewage treatment plant upgrade years at the two Saline River stations: station 5, above the facility, and station 8, below. Aside from decreases in mean chloride concentration, there were only two instances of decreased values at other stations: nitrate-N from 5.4 mg/l to 5.1 mg/l at station 6, and ammonia-N from 95.0 µg/l to 61.4 µg/l at station 7.

The ammonia-N concentrations of 40,000 µg/l and 46,000 µg/l at well E suggest that the animal waste holding tank near this well may have lost its integrity, and should be examined.

The levels of nitrate-N at well B (13.27 mg/l in December and 16.79 mg/l in March) above the 10 mg/l limit recommended for infants by the National Academy of Science are a matter for concern. If drinking water is drawn from the same aquifer as this well, there is a potential for the development of methemoglobinemia in young children.

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APPENDIX A

Minimum, Maximum and Mean Values by Station

Table . MINIMUM, MAXIMUM AND MEAN VALUES BY STATION FOR 1988.

STATION	PARAMETER	(UNITS)	MINIMUN	MAXIMUM	MEAN
	SUSP SOLIDS	mg/l	1.7	748	38.8
	AMMONIA	ug/l	37.0	433	125.1
	NITRATE	mg/l	0.1	13	2.6
3	SOL.REACT P	ug/l	1.0	102	12.5
	AVAILABLE P	ug/l	3.0	36	11.9
	TOTAL P	ug/l	10.0	263	50.4
	SILICA	mg/l	4.8	15	11.2
	CHLORIDE	mg/l	14.3	50	30.5
	DISCHARGE	m3/sec	.001	.50	.122
	SUSP SOLIDS	mg/l	4.8	258	22.8
	AMMONIA	ug/l	24.0	362	84.3
	NITRATE	mg/l	0.7	12	3.5
3A	SOL.REACT P	ug/l	1.0	88	11.7
	AVAILABLE P	ug/l	5.0	40	12.4
	TOTAL P	ug/l	10.0	180	53.2
	SILICA	mg/l	4.7	14	9.4
	CHLORIDE	mg/l	14.6	32	25.8
	DISCHARGE	m3/sec	.130	10.0	1.32
	SUSP SOLIDS	mg/l	2.3	478	33.3
	AMMONIA	ug/l	10.0	202	49.7
	NITRATE	mg/l	0.1	11	2.9
4	SOL.REACT P	ug/l	1.0	129	14.0
	AVAILABLE P	ug/l	4.0	44	11.3
	TOTAL P	ug/l	10.0	380	68.9
	SILICA	mg/l	2.5	15	9.5
	CHLORIDE	mg/l	13.0	45	29.9
	DISCHARGE	m3/sec	.002	2.34	.135
	SUSP SOLIDS	mg/l	4.0	520	49.5
	AMMONIA	ug/l	24.0	388	94.6
	NITRATE	mg/l	0.3	9	3.3
5	SOL.REACT P	ug/l	3.0	109	18.5
	AVAILABLE P	ug/l	5.0	52	15.2
	TOTAL P	ug/l	23.0	278	86.6
	SILICA	mg/l	4.2	14	9.7
	CHLORIDE	mg/l	14.9	38	28.8
	DISCHARGE	m3/sec	.150	13.1	1.54

Table . continued

STATION	PARAMETER	(UNITS)	MINIMUM	MAXIMUM	MEAN
	SUSP SOLIDS	mg/l	0.9	73	7.5
	AMMONIA	ug/l	13.0	62	31.7
	NITRATE	mg/l	0.1	15	5.1
6	SOL.REACT P	ug/l	2.0	116	19.0
	AVAILABLE P	ug/l	2.0	42	7.5
	TOTAL P	ug/l	5.0	290	64.7
	SILICA	mg/l	0.2	39	11.2
	CHLORIDE	mg/l	39.0	153	68.7
	DISCHARGE	m3/sec	.001	.47	.082
	SUSP SOLIDS	mg/l	0.5	29	6.0
	AMMONIA	ug/l	10.0	624	61.4
	NITRATE	mg/l	0.5	29	9.8
7	SOL.REACT P	ug/l	3.0	310	32.3
	AVAILABLE P	ug/l	2.0	154	12.8
	TOTAL P	ug/l	4.0	330	70.5
	SILICA	mg/l	0.7	30	10.9
	CHLORIDE	mg/l	12.6	100	35.9
	DISCHARGE	m3/sec	.002	.48	.154
	SUSP SOLIDS	mg/l	3.2	123	39.4
	AMMONIA	ug/l	10.0	510	74.9
	NITRATE	mg/l	0.7	12	3.8
8	SOL.REACT P	ug/l	8.0	111	36.4
	AVAILABLE P	ug/l	6.0	35	19.5
	TOTAL P	ug/l	38.0	257	143.8
	SILICA	mg/l	1.7	13	8.9
	CHLORIDE	mg/l	30.0	118	61.8
	DISCHARGE	m3/sec	.270	8.74	2.01
	SUSP SOLIDS	mg/l	2.0	478	39.1
	AMMONIA	ug/l	14.0	5748	365.6
	NITRATE	mg/l	0.2	18	5.4
9	SOL.REACT P	ug/l	5.0	1169	100.5
	AVAILABLE P	ug/l	4.0	121	18.9
	TOTAL P	ug/l	27.0	2000	198.1
	SILICA	mg/l	0.5	20	8.4
	CHLORIDE	mg/l	21.0	80	41.8
	DISCHARGE	m3/sec	.001	.88	.124

APPENDIX B

Chemical Data for Stations Per Sampling Date

SALINE VALLEY January 06, 1988

DATE = 010688	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	STA. 9
pH	7.0	7.2	7.3	7.4	7.4	7.5	7.7	7.7
CONDUCTIVITY (UMOHS)	880	800	860	840	840	680	860	800
SUS.. SOLIDS (MG/L)	10.0	12.0	9.6	17.6	2.2	0.5	5.5	5.2
AMMONIA-N (UG/L)	158	176	99	142	32	22	150	67
NITRATE-N (MG/L)	3.75	5.55	5.28	5.74	12.21	12.84	7.19	11.62
SOLUBLE-P (UG/L)	4	4	5	5	11	4	39	30
AVAILABLE-P (UG/L)	12	13	11	16	3	3	17	13
TOTAL-P (UG/L)	42	45	35	60	22	22	132	62
SILICA (MG/L)	11.7	8.8	9.7	10.1	6.9	6.1	10.0	10.0
CHLORIDE (MG/L)	49.5	27.3	41.7	33.6	59.0	31.4	59.0	53.5
DISCHARGE (M3/SEC)	.019	1.12	.002	1.14	.043	.211	2.60	.140
TEMPERATURE (FAHRENHEIT)	40	32	32	32	32	32	32	32
DAY (JULIAN)	3219	3219	3219	3219	3219	3219	3219	3219
WGHT DAY (DAYS)	-17	17	17	17	17	17	17	17

SALINE VALLEY January 20, 1988

DATE = 012088	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.0	7.1	7.3	7.3	7.3	7.3	7.4	7.5
CONDUCTIVITY (UMOHS)	400	480	420	460	520	540	460	300
SUS. SOLIDS (MG/L)	143	48	110	108	14	3.0	65	207
AMMONIA-N (UG/L)	383	362	202	388	62	37	510	501
NITRATE-N (MG/L)	4.30	4.21	4.01	4.36	6.06	6.16	4.23	4.79
SOLUBLE-P (UG/L)	102	88	107	109	50	14	111	216
AVAILABLE-P (UG/L)	35	21	25	29	11	4	23	40
TOTAL-P (UG/L)	263	166	380	218	170	42	212	456
SILICA (MG/L)	6.3	5.5	5.6	5.8	4.9	6.7	6.0	4.7
CHLORIDE (MG/L)	29.1	22.1	24.4	24.1	41.9	22.8	36.3	21.0
DISCHARGE (M3/SEC)	.010	4.16	.450	4.62	.210	.450	8.74	.550
TEMPERATURE (FAHRENHEIT)	35	35	34	34	32	35	32	33
DAY (JULIAN)	3233	3233	3233	3233	3233	3233	3233	3233
WGHT DAY (DAYS)	10	10	10	10	10	10	10	10

SALINE VALLEY January 27, 1988

DATE = 012788	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.3	7.5	7.6	7.6	7.5	7.5	7.6	7.5
CONDUCTIVITY (UMOHS)	880	780	840	840	850	700	800	820
SUS. SOLIDS (MG/L)	4.3	14.8	6.8	14.7	1.2	1.6	6.7	31.5
AMMONIA-N (UG/L)	119	110	77	93	21	10	168	5748
NITRATE-N (MG/L)	2.46	4.33	4.12	4.70	8.30	9.42	5.60	7.88
SOLUBLE-P (UG/L)	5	5	5	5	9	4	32	1169
AVAILABLE-P (UG/L)	12	22	14	17	2	3	17	22
TOTAL-P (UG/L)	30	47	29	41	20	4	96	2000
SILICA (MG/L)	8.4	7.5	8.7	8.9	5.5	5.1	8.7	8.4
CHLORIDE (MG/L)	33.5	27.2	38.9	31.8	67.6	26.4	55.8	47.2
DISCHARGE (M3/SEC)	.021	1.26	.005	1.28	.038	.197	2.28	.140
TEMPERATURE (FAHRENHEIT)	40	32	32	31	31	31	31	30
DAY (JULIAN)	3240	3240	3240	3240	3240	3240	3240	3240
WGHT DAY (DAYS)	11	11	11	11	11	11	11	11

SALINE VALLEY February 10, 1988

DATE = 021088	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.4	7.5	7.5	7.6	7.5	7.5	7.6	7.6
CONDUCTIVITY (UMOHS)	660	760	790	790	760	680	830	730
SUS. SOLIDS (MG/L)	6.7	11.7	5.5	9.7	0.9	0.8	7.5	4.4
AMMONIA-N (UG/L)	113	91	46	81	17	10	95	110
NITRATE-N (MG/L)	2.78	4.11	3.43	4.22	8.31	8.80	5.85	8.28
SOLUBLE-P (UG/L)	5	6	5	7	8	5	21	32
AVAILABLE-P (UG/L)	11	9	8	11	2	2	11	12
TOTAL-P (UG/L)	61	37	60	49	5	4	62	59
SILICA (MG/L)	11.6	8.5	8.8	9.4	5.2	5.6	9.6	8.0
CHLORIDE (MG/L)	33.2	25.9	35.9	30.2	54.5	25.4	60.6	42.5
DISCHARGE (M3/SEC)	.021	1.26	.002	1.28	.040	.220	3.01	.120
TEMPERATURE (FAHRENHEIT)	40	32	32	31	31	31	30	31
DAY (JULIAN)	3254	3254	3254	3254	3254	3254	3254	3254
WGHT DAY (DAYS)	17	17	17	17	17	17	17	17

SALINE VALLEY March 4, 1988

DATE = 030488	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.4	7.3	7.4	7.5	7.5	7.5	7.5	7.7
CONDUCTIVITY (UMOHS)	770	740	700	760	760	700	710	680
SUS. SOLIDS (MG/L)	14	29	10	18	2	2	45	10
AMMONIA-N (UG/L)	77	87	40	86	19	13	184	99
NITRATE-N (MG/L)	3.09	3.70	3.23	3.98	5.39	4.51	3.98	7.06
SOLUBLE-P (UG/L)	6	9	7	9	10	6	26	34
AVAILABLE-P (UG/L)	18	12	12	14	3	2	18	8
TOTAL-P (UG/L)	36	46	48	44	19	14	93	58
SILICA (MG/L)	7.8	5.3	6.3	6.5	2.4	4.6	6.2	5.6
CHLORIDE (MG/L)	30.0	24.6	28.5	24.7	45.4	18.8	43.2	36.4
DISCHARGE (M3/SEC)	.053	1.54	.120	1.71	.123	.264	4.09	.270
TEMPERATURE (FAHRENHEIT)	36	31	31	31	31	32	32	30
DAY (JULIAN)	3277	3277	3277	3277	3277	3277	3277	3277
WGHT DAY (DAYS)	14	14	14	14	14	14	14	14

SALINE VALLEY March 9, 1988

DATE = 030988	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.4	7.4	7.5	7.5	7.6	7.6	7.7	7.7
CONDUCTIVITY (UMOHS)	520	560	480	540	540	480	690	500
SUS. SOLIDS (MG/L)	25	41	31	33	4	4	27	36
AMMONIA-N (UG/L)	75	92	53	92	13	11	94	90
NITRATE-N (MG/L)	3.85	3.72	3.13	3.70	4.82	3.19	3.90	5.97
SOLUBLE-P (UG/L)	7	7	15	14	8	6	20	29
AVAILABLE-P (UG/L)	21	9	9	14	3	2	10	9
TOTAL-P (UG/L)	67	62	59	65	26	24	70	93
SILICA (MG/L)	5.8	4.9	4.6	5.2	1.9	3.8	5.5	5.0
CHLORIDE (MG/L)	25.3	21.2	23.5	24.4	39.0	12.6	43.9	26.8
DISCHARGE (M3/SEC)	.180	3.06	.253	3.49	.146	.345	3.37	.260
TEMPERATURE (FAHRENHEIT)	40	40	38	40	40	38	41	39
DAY (JULIAN)	3282	3282	3282	3282	3282	3282	3282	3282
WGHT DAY (DAYS)	11	11	11	11	11	11	11	11

SALINE VALLEY March 23, 1988

DATE = 032388	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.6	7.6	7.8	7.8	8.0	8.0	8.0	8.1
CONDUCTIVITY (UMOHS)	900	780	760	800	760	620	800	740
SUS. SOLIDS (MG/L)	5	9	4	6	4	3	8	5
AMMONIA-N (UG/L)	50	42	23	30	13	14	26	26
NITRATE-N (MG/L)	2.05	3.42	2.05	3.56	7.28	5.89	4.37	7.56
SOLUBLE-P (UG/L)	5	5	5	6	4	4	12	9
AVAILABLE-P (UG/L)	5	6	5	6	2	2	8	6
TOTAL-P (UG/L)	18	25	18	23	12	15	38	27
SILICA (MG/L)	8.3	5.1	2.9	5.4	0.6	0.7	4.6	3.4
CHLORIDE (MG/L)	32.3	24.3	33.7	28.1	52.5	21.4	52.4	41.2
DISCHARGE (M3/SEC)	.027	1.04	.006	1.07	.050	.136	1.87	.065
TEMPERATURE (FAHRENHEIT)	46	42	42	39	46	47	40	40
DAY (JULIAN)	3296	3296	3293	3296	3296	3296	3296	3296
WGHT DAY (DAYS)	10	10	10	10	10	10	10	10

SALINE VALLEY March 30, 1988

DATE = 033088	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.2	7.1	7.4	7.5	7.5	7.6	7.6	7.7
CONDUCTIVITY (UMOHS)	780	680	650	680	740	540	740	680
SUS. SOLIDS (MG/L)	6	17	8	8	1	2	19	7
AMMONIA-N (UG/L)	345	44	54	46	21	15	73	44
NITRATE-N (MG/L)	2.39	2.55	1.93	2.39	6.01	3.29	2.52	5.80
SOLUBLE-P (UG/L)	6	5	4	4	4	3	8	7
AVAILABLE-P (UG/L)	8	15	16	11	4	4	19	10
TOTAL-P (UG/L)	61	41	32	36	15	15	67	31
SILICA (MG/L)	5.6	4.7	2.5	4.2	0.5	0.7	4.3	3.2
CHLORIDE (MG/L)	38.6	24.5	37.4	30.4	61.1	20.3	51.2	42.6
DISCHARGE (M3/SEC)	.043	1.58	.055	1.67	.075	.231	2.47	.110
TEMPERATURE (FAHRENHEIT)	46	43	44	46	46	46	46	44
DAY (JULIAN)	3303	3303	3303	3303	3303	3303	3303	3303
WGHT DAY (DAYS)	11	11	11	11	11	11	11	11

SALINE VALLEY April 13, 1988

DATE = 041388	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.5	7.6	7.6	7.6	7.7	7.8	7.8	7.8
CONDUCTIVITY (UMOHS)	800	660	610	670	730	580	700	650
SUS. SOLIDS (MG/L)	8	32	17	29	3	4	66	10
AMMONIA-N (UG/L)	65	62	43	89	43	31	78	72
NITRATE-N (MG/L)	2.00	2.91	1.81	2.80	5.84	5.44	2.78	6.21
SOLUBLE-P (UG/L)	4	4	6	9	4	3	18	10
AVAILABLE-P (UG/L)	16	20	11	17	5	4	8	8
TOTAL-P (UG/L)	31	64	47	60	23	19	113	35
SILICA (MG/L)	7.2	5.1	4.9	5.6	0.7	1.2	6.9	1.9
CHLORIDE (MG/L)	33.7	21.9	27.1	25.5	55.5	22.4	43.6	39.6
DISCHARGE (M3/SEC)	.045	1.83	.052	1.93	.045	.197	2.94	.085
TEMPERATURE (FAHRENHEIT)	53	52	53	50	57	56	54	52
DAY (JULIAN)	3317	3317	3317	3317	3317	3317	3317	3317
WGHT DAY (DAYS)	10	10	10	10	10	10	10	10

SALINE VALLEY April 27, 1988

DATE = 042788	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.3	7.4	7.5	7.6	7.6	7.7	7.8	7.8
CONDUCTIVITY (UMOHS)	900	800	780	840	840	640	840	740
SUS. SOLIDS (MG/L)	6	7	3	4	2	3	9	2
AMMONIA-N (UG/L)	76	26	14	24	37	34	11	23
NITRATE-N (MG/L)	1.20	2.72	1.33	2.35	2.87	4.50	1.93	3.02
SOLUBLE-P (UG/L)	4	4	4	3	3	3	10	5
AVAILABLE-P (UG/L)	9	12	5	5	4	4	6	4
TOTAL-P (UG/L)	20	28	21	31	20	18	57	48
SILICA (MG/L)	11.0	4.8	3.2	5.3	0.6	2.2	1.7	0.5
CHLORIDE (MG/L)	30.8	24.0	30.4	27.8	57.5	20.5	56.0	41.8
DISCHARGE (M3/SEC)	.013	0.71	.016	0.74	.093	.131	1.26	.049
TEMPERATURE (FAHRENHEIT)	47	46	48	46	46	47	50	47
DAY (JULIAN)	3331	3331	3331	3331	3331	3331	3331	3331
WGHT DAY (DAYS)	14	14	14	14	14	14	14	14

SALINE VALLEY May 11, 1988

DATE = 051188	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.3	7.4	7.6	7.6	7.9	7.9	7.9	7.9
CONDUCTIVITY (UMOHS)	980	900	900	900	1020	660	900	820
SUS. SOLIDS (MG/L)	4	8	5	6	5	2	30	4
AMMONIA-N (UG/L)	433	79	42	102	20	26	45	220
NITRATE-N (MG/L)	0.82	2.32	1.06	1.85	0.98	3.16	1.51	2.82
SOLUBLE-P (UG/L)	4	5	4	5	4	4	32	29
AVAILABLE-P (UG/L)	12	10	7	8	5	4	20	7
TOTAL-P (UG/L)	28	27	21	28	33	33	131	73
SILICA (MG/L)	11.8	7.2	7.1	8.5	6.4	4.6	4.5	5.7
CHLORIDE (MG/L)	29.5	25.0	28.9	27.8	107.2	20.0	64.8	41.4
DISCHARGE (MG/SEC)	.021	0.46	.010	0.49	.030	.110	1.15	.032
TEMPERATURE (FAHRENHEIT)	55	56	58	50	64	61	60	55
DAY (JULIAN)	3338	3338	3338	3338	3338	3338	3338	3338
WGHT DAY (DAYS)	14	14	14	14	14	14	14	14

SALINE VALLEY May 18, 1988

DATE = 051888	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.1	7.3	7.5	7.5	7.8	7.6	7.7	7.8
CONDUCTIVITY (UMOHS)	810	740	740	740	680	520	760	680
SUS. SOLIDS (MG/L)	7	8	5	10	3	2	35	8
AMMONIA-N (UG/L)	254	83	68	98	32	31	55	332
NITRATE-N (MG/L)	0.72	2.06	0.92	1.64	0.50	6.17	1.95	2.40
SOLUBLE-P (UG/L)	5	5	5	5	5	4	26	44
AVAILABLE-P (UG/L)	13	10	5	8	5	4	20	7
TOTAL-P (UG/L)	25	40	33	44	37	29	141	102
SILICA (MG/L)	13.1	7.2	7.3	8.9	0.5	1.8	5.9	7.9
CHLORIDE (MG/L)	28.2	24.3	27.8	27.2	64.5	22.7	63.7	38.8
DISCHARGE (M3/SEC)	.001	0.36	.003	0.37	.017	.082	0.92	.012
TEMPERATURE (FAHRENHEIT)	56	56	56	54	60	62	61	58
DAY (JULIAN)	3345	3345	3345	3345	3345	3345	3345	3345
WGHT DAY (DAYS)	7	7	7	7	7	7	7	7

SALINE VALLEY May 25, 1988

DATE = 052588	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.3	7.4	7.5	7.4	7.4	7.4	7.6	7.8
CONDUCTIVITY (UMOHS)	1000	950	950	950	860	630	960	860
SUS. SOLIDS (MG/L)	3	9	4	8	13	1	42	8
AMMONIA-N (UG/L)	107	72	42	61	26	25	62	115
NITRATE-N (MG/L)	0.37	1.66	0.56	1.21	0.21	5.36	1.40	1.27
SOLUBLE-P (UG/L)	7	7	7	7	7	6	42	66
AVAILABLE-P (UG/L)	8	11	6	7	5	4	21	9
TOTAL-P (UG/L)	24	42	46	37	61	25	132	119
SILICA (MG/L)	13.4	8.4	9.1	9.8	0.2	2.7	8.2	10.4
CHLORIDE (MG/L)	28.1	24.9	28.0	27.1	74.2	23.8	64.2	40.4
DISCHARGE (M3/SEC)	.011	0.38	.006	0.39	.008	.076	0.71	.021
TEMPERATURE (FAHRENHEIT)	52	52	56	50	56	58	60	54
DAY (JULIAN)	3352	3352	3352	3352	3352	3352	3352	3352
WGHT DAY (DAYS)	10	10	10	10	10	10	10	10

SALINE VALLEY June 6, 1988

DATE = 060888	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.7	7.8	7.9	7.9	-0	8.0	8.2	8.1
CONDUCTIVITY (UMOHS)	880	920	820	880	-0	730	920	740
SUS. SOLIDS (MG/L)	4	8	4	26	-0	4	52	24
AMMONIA-N (UG/L)	101	141	39	83	-0	47	70	299
NITRATE-N (MG/L)	0.37	2.26	0.78	1.42	-0	0.53	1.74	1.41
SOLUBLE-P (UG/L)	7	15	7	20	-0	5	50	100
AVAILABLE-P (UG/L)	6	10	6	10	-0	7	24	121
TOTAL-P (UG/L)	14	37	35	57	-0	37	171	209
SILICA (MG/L)	12.9	11.8	12.3	11.7	-0	11.9	11.0	12.9
CHLORIDE (MG/L)	27.6	27.3	27.3	28.0	-0	27.3	77.6	46.1
DISCHARGE (MS/SEC)	.021	0.25	0.003	0.27	-0	.026	0.49	0.005
TEMPERATURE (FAHRENHEIT)	55	62	64	62	-0	64	65	62
DAY (JULIAN)	3366	3366	3366	3366	-0	3366	3366	3366
WGHT DAY (DAYS)	14	14	14	14	-0	14	14	14

C. Station 6 dry.

SALINE VALLEY June 22, 1988

DATE = 062288	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.7	7.6	7.6	7.8	-0	-0	7.8	7.9
CONDUCTIVITY (UMOHS)	620	640	700	780	-0	-0	880	680
SUS. SOLIDS (MG/L)	2	5	3	5	-0	-0	123	11
AMMONIA-N (UG/L)	102	74	10	62	-0	-0	54	151
NITRATE-N (MG/L)	0.31	1.16	0.19	0.73	-0	-0	1.26	0.19
SOLUBLE-P (UG/L)	9	9	8	9	-0	-0	70	166
AVAILABLE-P (UG/L)	5	7	5	9	-0	-0	33	16
TOTAL-P (UG/L)	16	29	29	55	-0	-0	257	218
SILICA (MG/L)	13.4	12.1	13.0	11.8	-0	-0	11.3	14.4
CHLORIDE (MG/L)	25.9	26.1	25.3	26.9	-0	-0	106.3	51.5
DISCHARGE (M3/SEC)	.020	0.21	.002	0.23	-0	-0	.920	.002
TEMPERATURE (FAHRENHEIT)	64	70	70	70	-0	-0	74	72
DAY (JULIAN)	3380	3380	3380	3380	-0	-0	3380	3380
WGHT DAY (DAYS)	14	14	14	14	-0	-0	14	14

C. Stations 6 & 7 dry.

SALINE VALLEY July 6, 1988

DATE = 070688	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.5	7.5	7.7	7.9	-0	-0	7.9	7.9
CONDUCTIVITY (UMOHS)	900	980	780	900	-0	-0	1020	740
SUS. SOLIDS (MG/L)	2.2	6.3	2.3	18	-0	-0	35	22
AMMONIA-N (UG/L)	97	75	10	68	-0	-0	10	1107
NITRATE-N (MG/L)	1.31	3.46	1.07	2.31	-0	-0	1.23	1.33
SOLUBLE-P (UG/L)	9	9	9	9	-0	-0	35	123
AVAILABLE-P (UG/L)	4	6	4	7	-0	-0	20	21
TOTAL-P (UG/L)	16	29	25	46	-0	-0	192	197
SILICA (MG/L)	13.9	13.2	13.6	12.7	-0	-0	6.8	11.5
CHLORIDE (MG/L)	26.4	27.1	27.0	27.8	-0	-0	117.6	52.2
DISCHARGE (M3/SEC)	.009	0.14	.003	0.15	-0	-0	0.28	.001
TEMPERATURE (FAHRENHEIT)	56	66	66	66	-0	-0	70	66
DAY (JULIAN)	3394	3394	3394	3394	-0	-0	3394	3394
WGHT DAY (DAYS)	14	14	14	14	-0	-0	14	14

C. Station 6 & 7 dry.

SALINE VALLEY July 20, 1988

DATE = 072088	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.6	7.5	7.5	7.6	-0	7.6	7.7	7.7
CONDUCTIVITY (UMOHS)	940	1000	780	920	-0	820	950	860
SUS. SOLIDS (MG/L)	1.8	4.8	3.8	14	-0	29	54	50
AMMONIA-N (UG/L)	82	78	10	59	-0	133	24	440
NITRATE-N (MG/L)	0.09	0.77	0.09	0.34	-0	7.52	0.72	0.16
SOLUBLE-P (UG/L)	6	6	6	7	-0	9	52	252
AVAILABLE-P (UG/L)	4	6	4	8	-0	20	25	34
TOTAL-P (UG/L)	12	25	25	46	-0	102	235	334
SILICA (MG/L)	14.5	13.7	14.9	13.4	-0	27.6	12.8	20.2
CHLORIDE (MG/L)	25.6	27.1	23.1	26.8	-0	48.6	92.3	80.0
DISCHARGE (M3/SEC)	.015	0.15	.002	0.16	-0	.029	0.27	.002
TEMPERATURE (FAHRENHEIT)	62	68	68	68	-0	68	72	70
DAY (JULIAN)	3408	3408	3408	3408	-0	3408	3408	3408
WGHT DAY (DAYS)	11	11	11	11	-0	11	11	11

C. Station 6 dry.

SALINE VALLEY July 26, 1988

DATE = 072688	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	STA. 9
pH	7.6	7.4	7.6	7.6	-0	7.4	7.8	7.8
CONDUCTIVITY (UMOHS)	840	900	740	900	-0	840	920	700
SUS. SOLIDS (MG/L)	2.1	6.8	5.6	11	-0	7.2	61	17
AMMONIA-N (UG/L)	66	53	12	80	-0	74	11	930
NITRATE-N (MG/L)	0.58	1.83	0.52	1.10	-0	14.86	1.57	1.38
SOLUBLE-P (UG/L)	5	6	5	10	-0	11	33	101
AVAILABLE-P (UG/L)	19	6	8	10	-0	9	28	26
TOTAL-P (UG/L)	20	46	59	78	-0	76	250	227
SILICA (MG/L)	14.2	12.7	14.0	13.2	-0	26.8	12.3	14.3
CHLORIDE (MG/L)	26.3	26.3	21.9	27.4	-0	48.9	87.7	35.2
DISCHARGE (M3/SEC)	.025	0.15	.003	0.18	-0	.029	0.42	.010
TEMPERATURE (FAHRENHEIT)	60	68	68	64	-0	68	70	68
DAY (JULIAN)	3414	3414	3414	3414	-0	3414	3414	3414
WGHT DAY (DAYS)	10	10	10	10	-0	10	10	10

C. Station 6 dry.

SALINE VALLEY August 10, 1988

DATE = 081088	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.5	7.3	7.5	7.5	-0	-0	7.7	-0
CONDUCTIVITY (UMOHS)	800	800	720	780	-0	-0	980	-0
SUS. SOLIDS (MG/L)	4.6	12	48	21	-0	-0	58	-0
AMMONIA-N (UG/L)	63	24	49	45	-0	-0	20	-0
NITRATE-N (MG/L)	0.09	0.71	1.41	0.44	-0	-0	1.7	-0
SOLUBLE-P (UG/L)	4	4	4	4	-0	-0	12	-0
AVAILABLE-P (UG/L)	4	8	10	25	-0	-0	22	-0
TOTAL-P (UG/L)	16	33	74	52	-0	-0	240	-0
SILICA (MG/L)	14.2	13.8	14.1	13.5	-0	-0	12	-0
CHLORIDE (MG/L)	26.2	27.1	30.1	27.6	-0	-0	50	-0
DISCHARGE (M3/SEC)	.017	0.13	.003	0.15	-0	-0	0.38	-0
TEMPERATURE (FAHRENHEIT)	66	78	80	74	-0	-0	78	-0
DAY (JULIAN)	3429	3429	3429	3429	-0	-0	3429	-0
WGHT DAY (DAYS)	11	11	11	11	-0	-0	11	-0

C. Stations 6, 7, & 9 dry.

SALINE VALLEY August 18, 1988

DATE = 081888	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.4	7.4	7.5	7.5	7.5	7.4	7.7	7.7
CONDUCTIVITY (UMOHS)	780	740	640	580	980	740	740	450
SUS. SOLIDS (MG/L)	1.7	9.3	24	380	8.6	12	59	51
AMMONIA-N (UG/L)	47	46	34	373	45	624	30	47
NITRATE-N (MG/L)	0.36	1.77	0.63	2.35	3.65	4.77	1.8	0.70
SOLUBLE-P (UG/L)	2	2	2	43	26	127	30	113
AVAILABLE-P (UG/L)	4	12	14	40	9	26	17	20
TOTAL-P (UG/L)	16	55	89	278	130	265	190	252
SILICA (MG/L)	15.1	14.4	14.0	11.7	32.6	23.2	12.0	8.4
CHLORIDE (MG/L)	26.9	26.6	22.9	25.5	78.2	100	30.0	29.1
DISCHARGE (M3/SEC)	.023	.137	.004	0.16	.001	.002	0.52	.001
TEMPERATURE (FAHRENHEIT)	66	75	76	74	78	76	76	78
DAY (JULIAN)	3437	3437	3437	3437	3437	3437	3437	3437
WGHT DAY (DAYS)	7	7	7	7	7	7	7	7

SALINE VALLEY August 24, 1988

DATE = 082488	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.5	7.5	7.4	7.5	7.6	7.5	7.7	7.8
CONDUCTIVITY (UMOHS)	920	900	820	880	1400	820	840	760
SUS. SOLIDS (MG/L)	8.5	6.6	17	19	1.6	13	58	13
AMMONIA-N (UG/L)	37	27	30	58	39	45	34	32
NITRATE-N (MG/L)	0.42	1.92	0.36	0.85	0.05	11.20	1.95	4.48
SOLUBLE-P (UG/L)	3	2	5	6	61	77	56	62
AVAILABLE-P (UG/L)	4	5	14	6	4	13	25	11
TOTAL-P (UG/L)	20	33	59	46	106	149	179	123
SILICA (MG/L)	14.3	13.3	13.4	13.5	39.4	25.0	11.6	9.7
CHLORIDE (MG/L)	30.1	25.8	27.5	29.7	98.3	63.7	38.5	43.8
DISCHARGE (M3/SEC)	.023	0.15	.003	0.18	.002	.004	0.44	.021
TEMPERATURE (FAHRENHEIT)	56	62	66	61	68	65	66	64
DAY (JULIAN)	3443	3443	3443	3443	3443	3443	3443	3443
WGHT DAY (DAYS)	11	11	11	11	11	11	11	11

SALINE VALLEY September 7, 1988

DATE = 090788	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.6	7.7	7.7	7.5	7.5	7.4	7.9	7.7
CONDUCTIVITY (UMOHS)	820	880	760	840	980	760	800	780
SUS. SOLIDS (MG/L)	8.5	4.9	12	31	12	11	36	5.5
AMMONIA-N (UG/L)	48	57	27	62	53	37	64	35
NITRATE-N (MG/L)	2.00	1.81	0.50	1.87	0.27	19.55	2.29	5.98
SOLUBLE-P (UG/L)	6	6	6	9	21	100	49	31
AVAILABLE-P (UG/L)	9	7	6	12	9	11	21	9
TOTAL-P (UG/L)	43	37	44	170	78	154	145	72
SILICA (MG/L)	13.9	12.6	12.1	13.1	33.6	21.7	11.2	10.0
CHLORIDE (MG/L)	34.2	29.4	27.7	32.0	75.6	50.9	65.5	44.0
DISCHARGE (M3/SEC)	.037	0.15	.004	0.19	.001	.026	0.68	.014
TEMPERATURE (FAHRENHEIT)	54	54	60	53	57	56	60	54
DAY (JULIAN)	3457	3457	3457	3457	3457	3457	3457	3457
WGHT DAY (DAYS)	14	14	14	14	14	14	14	14

SALINE VALLEY September 20, 1988

DATE = 092088	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.4	7.5	7.5	7.5	7.5	7.5	7.8	7.8
CONDUCTIVITY (UMOHS)	820	920	880	860	960	780	780	820
SUS. SOLIDS (MG/L)	2.0	10	18	35	4.1	19	42	8.4
AMMONIA-N (UG/L)	45	62	47	108	42	124	33	42
NITRATE-N (MG/L)	0.50	1.14	0.83	1.20	0.11	11.11	2.11	0.61
SOLUBLE-P (UG/L)	3	6	5	31	13	310	70	16
AVAILABLE-P (UG/L)	4	20	9	22	9	154	24	9
TOTAL-P (UG/L)	18	50	65	179	78	330	179	87
SILICA (MG/L)	14.6	13.4	13.0	13.2	28.3	30.0	11.5	5.3
CHLORIDE (MG/L)	30.1	27.4	27.0	33.2	87.3	55.7	103.9	39.4
DISCHARGE (M3/SEC)	.017	0.28	.008	0.31	.001	.027	0.42	.021
TEMPERATURE (FAHRENHEIT)	58	62	60	62	64	62	62	62
DAY (JULIAN)	3470	3470	3470	3470	3470	3470	3470	3470
WGHT DAY (DAYS)	10	10	10	10	10	10	10	10

SALINE VALLEY September 27, 1988

DATE = 092788	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.4	7.6	7.6	7.7	7.8	7.7	7.8	7.9
CONDUCTIVITY (UMOHS)	840	960	1040	960	980	800	780	800
SUS. SOLIDS (MG/L)	15	10	16	17	11	15	83	10
AMMONIA-N (UG/L)	51	74	52	50	40	37	50	32
NITRATE-N (MG/L)	3.22	4.77	10.90	5.99	0.18	13.85	8.77	5.38
SOLUBLE-P (UG/L)	1	1	1	56	2	57	33	49
AVAILABLE-P (UG/L)	8	6	8	8	8	13	18	7
TOTAL-P (UG/L)	25	60	75	200	100	250	200	100
SILICA (MG/L)	12.8	12.1	13.1	12.6	32.1	24.4	10.4	12.2
CHLORIDE (MG/L)	32.4	29.6	36.0	34.2	87.2	47.3	48.0	43.5
DISCHARGE (M3/SEC)	.045	0.46	.014	0.52	.002	.031	1.25	.047
TEMPERATURE (FAHRENHEIT)	62	66	64	62	66	66	64	64
DAY (JULIAN)	3477	3477	3477	3477	3477	3477	3477	3477
WGHT DAY (DAYS)	10	10	10	10	10	10	10	10

SALINE VALLEY October 13, 1988

DATE = 101388	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.7	7.8	7.9	7.9	7.8	7.8	7.9	7.8
CONDUCTIVITY (UMOHS)	940	970	920	920	1010	700	1000	820
SUS. SOLIDS (MG/L)	2.2	8.6	2.6	8.8	2.0	14	6.0	2.4
AMMONIA-N (UG/L)	56	70	30	45	27	26	24	25
NITRATE-N (MG/L)	1.06	1.69	0.89	1.54	0.05	16.68	2.71	0.99
SOLUBLE-P (UG/L)	3	2	2	4	8	33	30	12
AVAILABLE-P (UG/L)	3	7	5	8	5	9	11	7
TOTAL-P (UG/L)	10	10	10	63	100	78	98	33
SILICA (MG/L)	14.0	12.1	11.8	12.5	23.1	15.9	12.5	7.7
CHLORIDE (MG/L)	30.9	27.5	32.2	31.5	153.0	43.5	88.7	44.1
DISCHARGE (M3/SEC)	.027	0.29	.010	0.33	.001	.029	0.77	.019
TEMPERATURE (FAHRENHEIT)	48	42	43	42	40	42	44	40
DAY (JULIAN)	3493	3493	3493	3493	3493	3493	3493	3493
WGHT DAY (DAYS)	12	12	12	12	12	12	12	12

SALINE VALLEY October 20, 1988

DATE = 102088	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.4	7.6	7.8	7.8	7.8	7.6	7.9	8.0
CONDUCTIVITY (UMOHS)	800	1000	1000	880	820	820	760	860
SUS. SOLIDS (MG/L)	36	17	18	31	1.2	1.0	92	20
AMMONIA-N (UG/L)	66	75	39	59	29	24	24	34
NITRATE-N (MG/L)	8.99	7.15	11.30	8.00	3.98	9.65	4.19	10.31
SOLUBLE-P (UG/L)	9	9	8	11	46	15	42	60
AVAILABLE-P (UG/L)	31	21	20	26	8	6	25	25
TOTAL-P (UG/L)	136	78	98	111	93	37	217	145
SILICA (MG/L)	10.2	10.1	10.9	10.8	14.5	12.5	9.3	10.2
CHLORIDE (MG/L)	35.5	32.1	45.2	38.0	60.0	37.0	45.4	42.9
DISCHARGE (M3/SEC)	.156	1.49	.050	1.69	.055	.193	4.09	.120
TEMPERATURE (FAHRENHEIT)	49	48	47	48	48	48	52	46
DAY (JULIAN)	3500	3500	3500	3500	3500	3500	3500	3500
WGHT DAY (DAYS)	12	12	12	12	12	12	12	12

SALINE VALLEY November 3, 1988

DATE = 110388	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.5	7.6	7.8	7.7	8.0	7.9	7.9	8.0
CONDUCTIVITY (UMOHS)	1010	1005	1000	1000	1005	700	1005	880
SUS. SOLIDS (MG/L)	3.2	5.3	4.2	5.2	1.6	2.0	3.2	2.6
AMMONIA-N (UG/L)	64	55	14	31	17	59	17	14
NITRATE-N (MG/L)	3.06	3.82	3.71	3.82	4.11	15.0	4.63	4.57
SOLUBLE-P (UG/L)	6	7	7	6	17	10	31	22
AVAILABLE-P (UG/L)	6	8	7	8	4	3	9	10
TOTAL-P (UG/L)	15	19	19	26	33	24	67	55
SILICA (MG/L)	12.9	10.7	10.3	11.6	15.1	11.2	11.7	9.5
CHLORIDE (MG/L)	36.1	28.8	39.3	36.2	72.1	31.5	52.1	44.4
DISCHARGE (M3/SEC)	.035	0.45	.019	0.50	.013	.068	1.20	.032
TEMPERATURE (FAHRENHEIT)	48	50	50	50	50	50	48	46
DAY (JULIAN)	3514	3514	3514	3514	3514	3514	3514	3514
WGHT DAY (DAYS)	10	10	10	10	10	10	10	10

SALINE VALLEY November 10, 1988

DATE = 111088	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.0	7.0	7.1	7.1	7.0	7.1	7.4	7.5
CONDUCTIVITY (UMOHS)	380	560	380	450	1720	860	800	460
SUS. SOLIDS (MG/L)	748	258	478	520	73	5.0	41	478
AMMONIA-N (UG/L)	113	109	108	121	57	113	98	168
NITRATE-N (MG/L)	8.22	8.80	7.16	7.63	11.14	14.77	9.77	12.14
SOLUBLE-P (UG/L)	95	79	129	100	116	66	61	118
AVAILABLE-P (UG/L)	36	40	44	52	42	20	35	40
TOTAL-P (UG/L)	220	180	310	210	290	100	160	310
SILICA (MG/L)	4.8	5.8	5.6	5.6	7.5	8.2	9.1	5.9
CHLORIDE (MG/L)	14.3	14.6	13.0	14.9	50.3	46.4	42.2	22.7
DISCHARGE (M3/SEC)	>.50	10.0	2.34	13.10	.470	.430	5.69	.878
TEMPERATURE (FAHRENHEIT)	47	46	46	47	48	48	46	47
DAY (JULIAN)	3521	3521	3521	3521	3521	3521	3521	3521
WGHT DAY (DAYS)	10	10	10	10	10	10	10	10

SALINE VALLEY November 21, 1988

DATE = 112188	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.0	7.1	7.1	7.3	7.4	7.4	7.6	7.6
CONDUCTIVITY (UMOHS)	780	840	780	960	920	920	840	720
SUS. SOLIDS (MG/L)	106	50	96	90	15	4.0	38	110
AMMONIA-N (UG/L)	224	78	42	115	40	49	92	62
NITRATE-N (MG/L)	12.64	12.12	7.81	9.06	14.90	28.81	11.81	18.15
SOLUBLE-P (UG/L)	45	38	37	48	28	7	15	63
AVAILABLE-P (UG/L)	27	30	33	36	21	15	30	35
TOTAL-P (UG/L)	200	155	210	240	75	60	120	290
SILICA (MG/L)	6.5	7.8	7.7	7.8	7.2	8.2	9.3	7.8
CHLORIDE (MG/L)	26.8	25.3	26.7	26.3	52.8	46.4	51.5	34.6
DISCHARGE (M3/SEC)	>.50	6.00	.646	7.56	.456	.484	5.06	.488
TEMPERATURE (FAHRENHEIT)	43	42	42	42	44	45	43	42
DAY (JULIAN)	3532	3532	3532	3532	3532	3532	3532	3532
WGHT DAY (DAYS)	10	10	10	10	10	10	10	10

SALINE VALLEY December 1, 1988

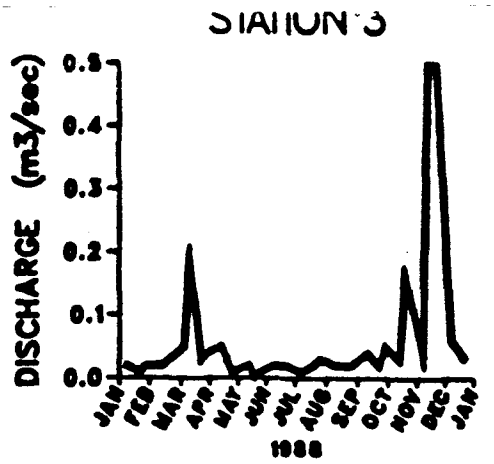
DATE = 120188	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.4	7.5	7.6	7.7	7.7	7.7	7.8	7.8
CONDUCTIVITY (UMOHS)	990	900	900	920	900	800	920	860
SUS. SOLIDS (MG/L)	6.1	9.6	52	15	1.0	1.0	12	5.6
AMMONIA-N (UG/L)	75	90	90	79	24	26	59	36
NITRATE-N (MG/L)	4.49	5.32	4.68	5.44	11.94	15.30	7.32	12.07
SOLUBLE-P (UG/L)	6	6	9	10	6	6	33	27
AVAILABLE-P (UG/L)	9	10	11	13	7	5	23	10
TOTAL-P (UG/L)	42	48	55	59	61	37	140	84
SILICA (MG/L)	10.5	8.4	9.5	8.9	5.3	6.9	9.5	8.8
CHLORIDE (MG/L)	35.8	27.4	36.0	32.1	60.8	35.9	53.2	46.4
DISCHARGE (M3/SEC)	.058	1.16	.052	1.27	.090	.188	2.23	.093
TEMPERATURE (FAHRENHEIT)	46	40	40	40	40	42	40	38
DAY (JULIAN)	3542	3542	3542	3542	3542	3542	3542	3542
WGHT DAY (DAYS)	14	14	14	14	14	14	14	14

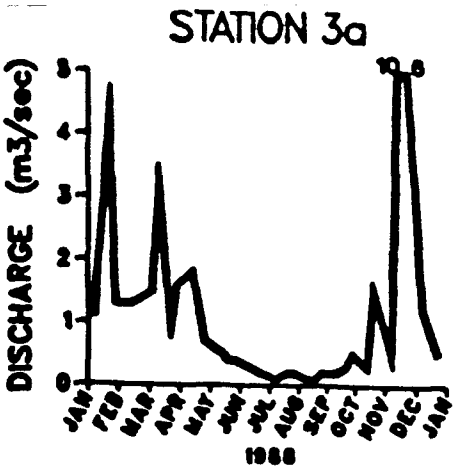
SALINE VALLEY December 21, 1988

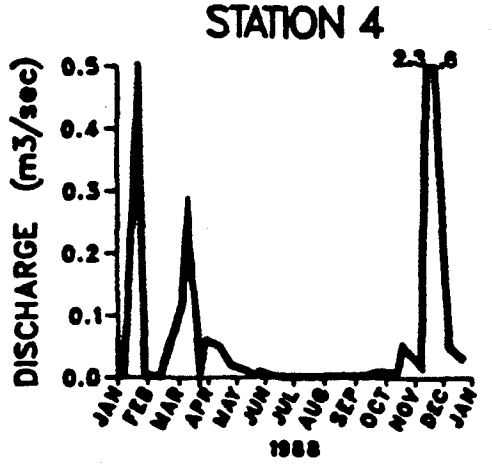
DATE = 122188	STA. 3	STA. 3A	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	ST. 9
pH	7.4	7.3	7.3	7.5	7.5	7.6	7.6	7.7
CONDUCTIVITY (UMOHS)	990	900	900	940	900	700	1000	800
SUS. SOLIDS (MG/L)	8.0	28	8.8	18	2.3	2.0	3.7	4.9
AMMONIA-N (UG/L)	285	99	95	103	23	23	57	67
NITRATE-N (MG/L)	4.46	5.69	3.80	5.33	7.79	13.15	5.15	5.98
SOLUBLE-P (UG/L)	4	3	3	4	4	6	30	19
AVAILABLE-P (UG/L)	6	5	5	7	7	4	15	10
TOTAL-P (UG/L)	18	55	25	33	10	12	73	45
SILICA (MG/L)	12.6	9.3	9.1	10.1	4.9	7.1	10.0	8.3
CHLORIDE (MG/L)	33.4	26.2	32.8	30.5	62.2	32.8	71.0	40.4
DISCHARGE (M3/SEC)	.025	0.54	.026	0.59	.041	.106	1.63	.098
TEMPERATURE (FAHRENHEIT)	44	38	36	38	32	37	32	32
DAY (JULIAN)	3562	3562	3562	3562	3562	3562	3562	3562
WGHT DAY (DAYS)	20	20	20	20	20	20	20	20

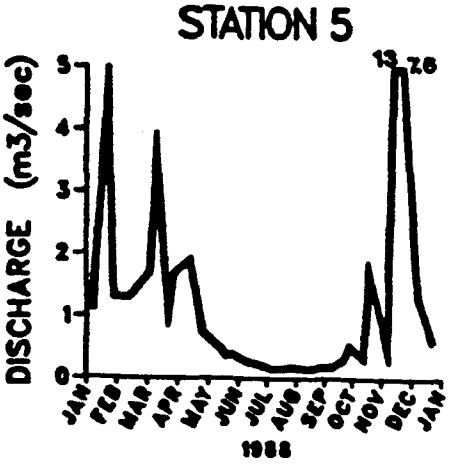
APPENDIX C

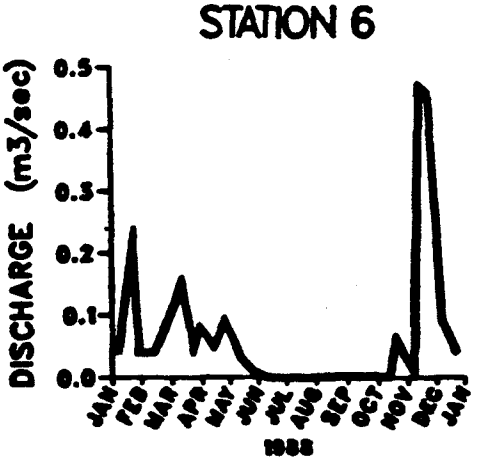
Chemical Data for Stations Per Sampling Date
(Graphic Presentation)

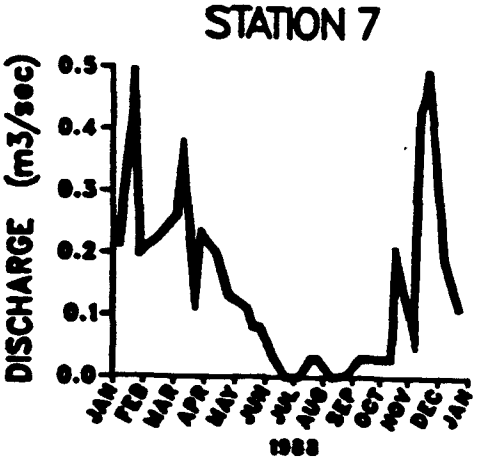

STATION 3
DISCHARGE (m3/sec)
0.0
0.1
0.2
0.3
0.4
0.5
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

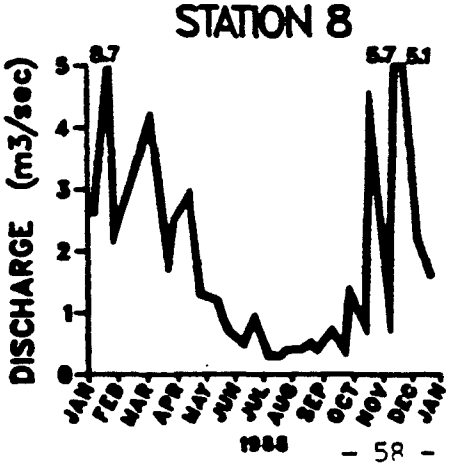

STATION 3a
DISCHARGE (m3/sec)
0
1
2
3
4
5
10.6
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

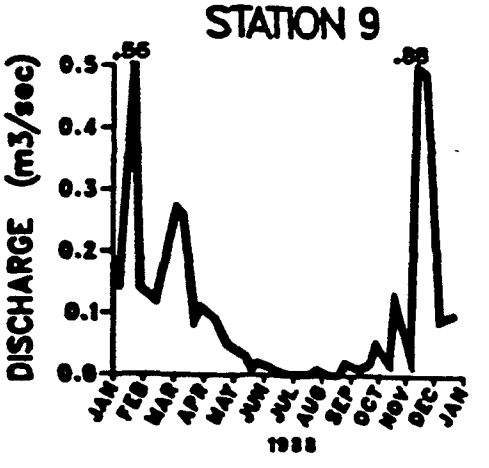

STATION 4
DISCHARGE (m3/sec)
0.0
0.1
0.2
0.3
0.4
0.5
2.3
.6
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

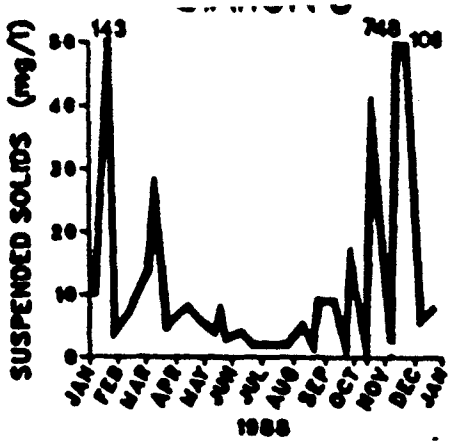

STATION 5
DISCHARGE (m3/sec)
0
1
2
3
4
5
13
7.6
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

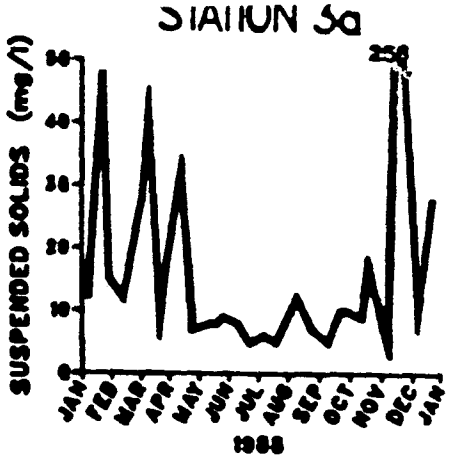

STATION 6
DISCHARGE (m3/sec)
0.0
0.1
0.2
0.3
0.4
0.5
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

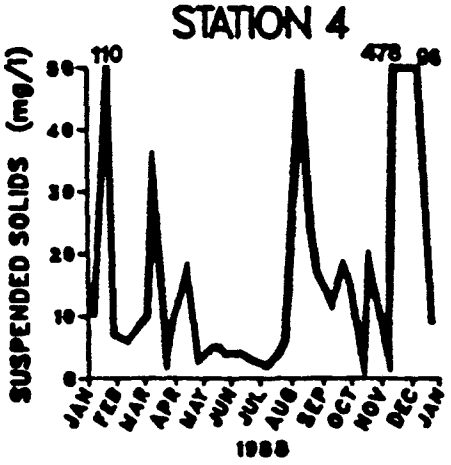

STATION 7
DISCHARGE (m3/sec)
0.0
0.1
0.2
0.3
0.4
0.5
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

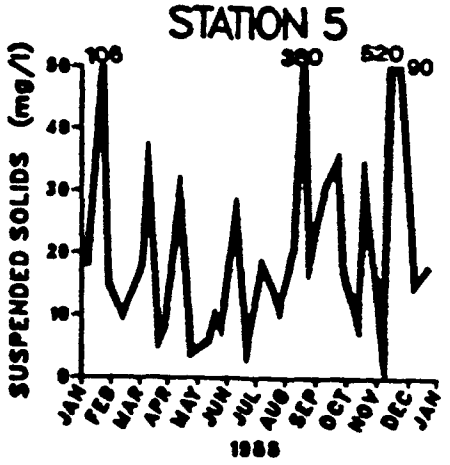

STATION 8
DISCHARGE (m3/sec)
0
1
2
3
4
5
5.7
5.1
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

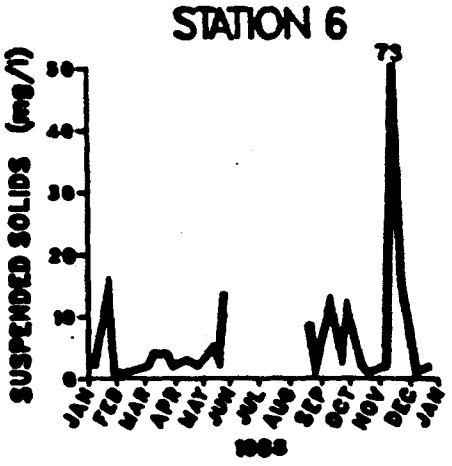

STATION 9
DISCHARGE (m3/sec)
0.0
0.1
0.2
0.3
0.4
0.5
.56
.55
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

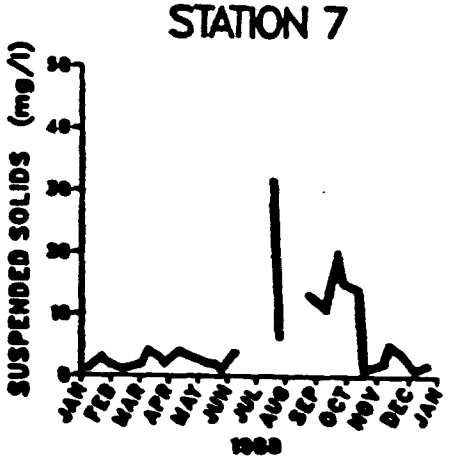

143
748
106
SUSPENDED SOLIDS (mg/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

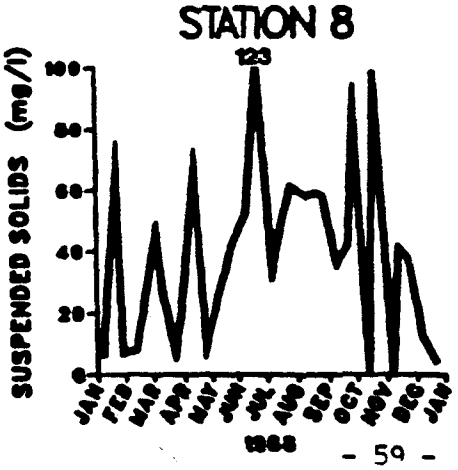

STATION 5a
256
SUSPENDED SOLIDS (mg/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

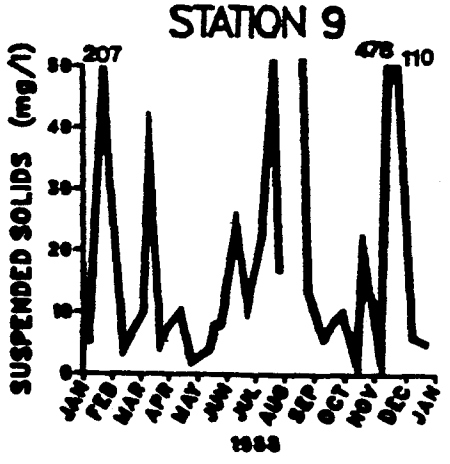

STATION 4
110
478
96
SUSPENDED SOLIDS (mg/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

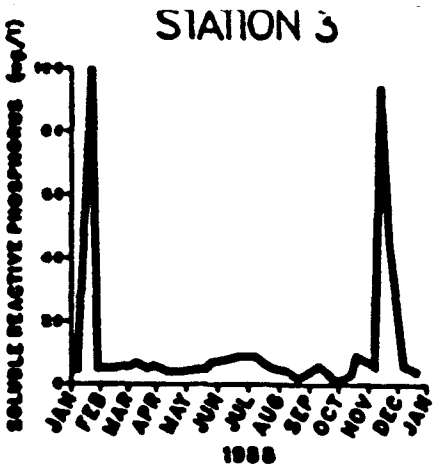

STATION 5
106
360
520
90
SUSPENDED SOLIDS (mg/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

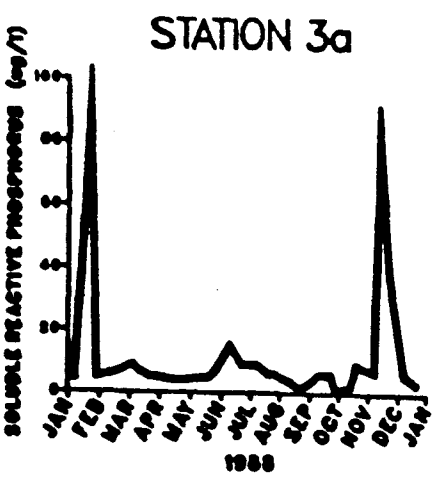

STATION 6
73
SUSPENDED SOLIDS (mg/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

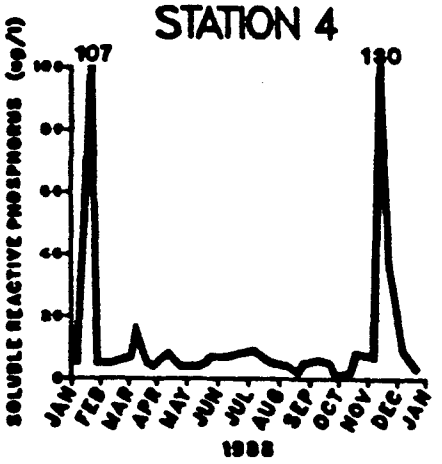

STATION 7
SUSPENDED SOLIDS (mg/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

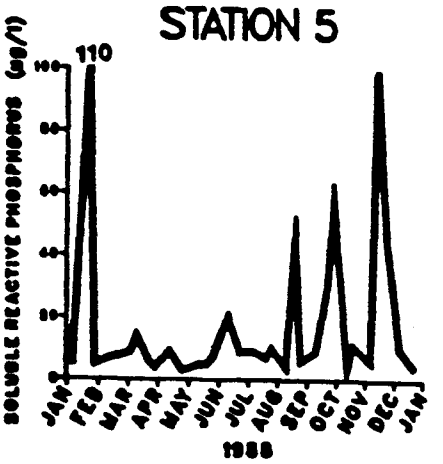

STATION 8
123
SUSPENDED SOLIDS (mg/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

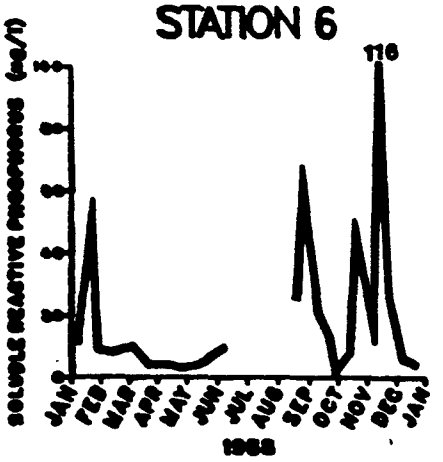

STATION 9
207
478
110
SUSPENDED SOLIDS (mg/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

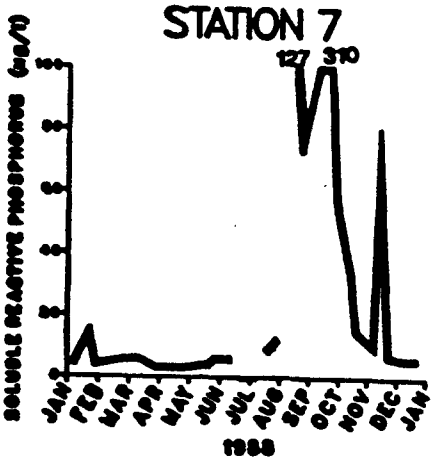

STATION 3
SOLUBLE REACTIVE PHOSPHORUS (ug/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

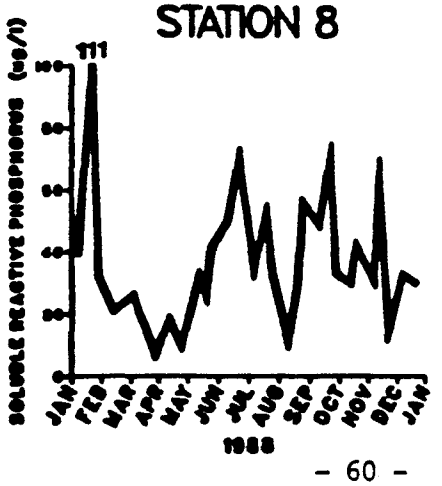

STATION 3a
SOLUBLE REACTIVE PHOSPHORUS (ug/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

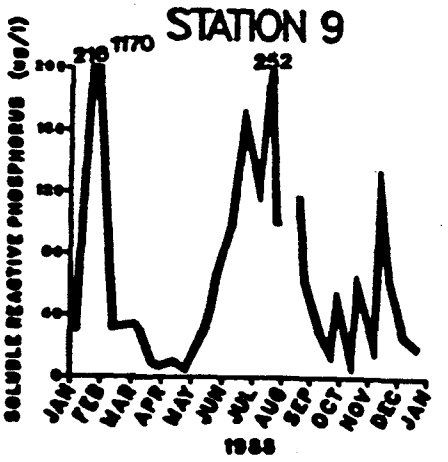

STATION 4
107
130
SOLUBLE REACTIVE PHOSPHORUS (ug/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

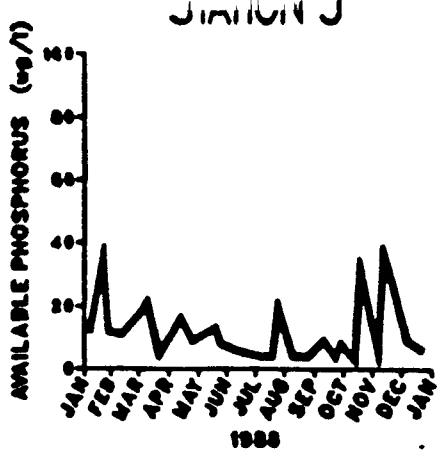

STATION 5
110
SOLUBLE REACTIVE PHOSPHORUS (ug/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

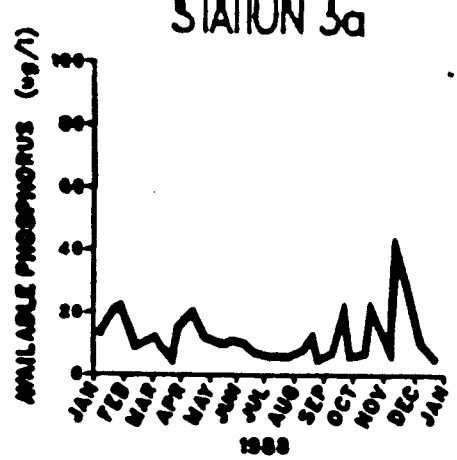

STATION 6
116
SOLUBLE REACTIVE PHOSPHORUS (ug/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

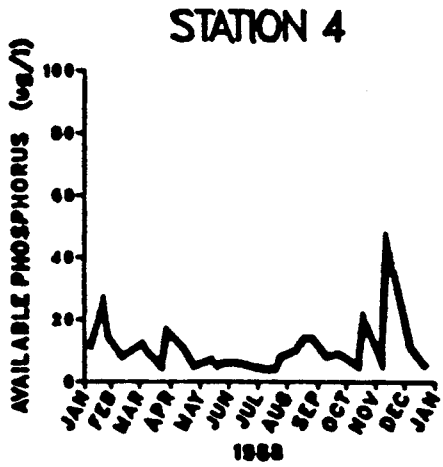

STATION 7
127
310
SOLUBLE REACTIVE PHOSPHORUS (ug/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

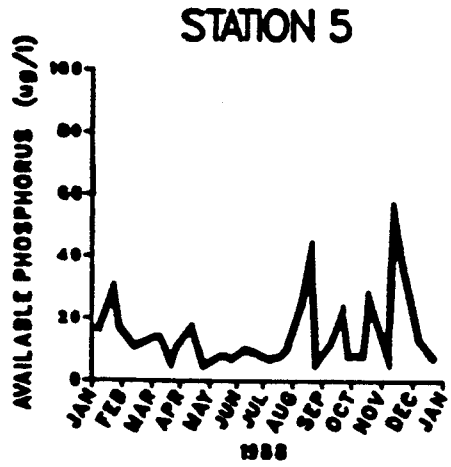

STATION 8
111
SOLUBLE REACTIVE PHOSPHORUS (ug/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

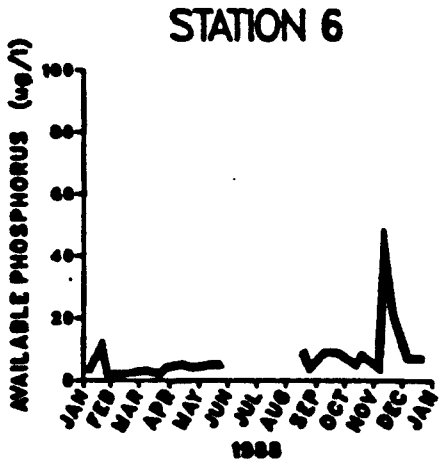

STATION 9
1170
252
SOLUBLE REACTIVE PHOSPHORUS (ug/l)
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

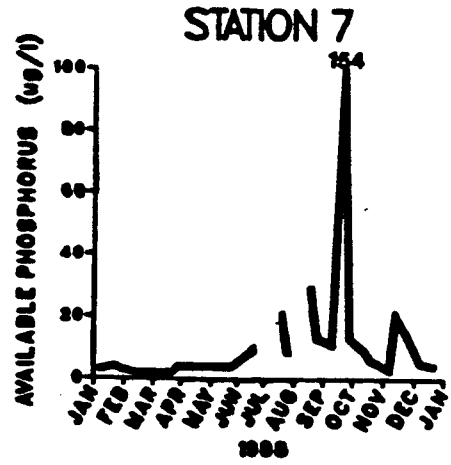

STATION 3
AVAILABLE PHOSPHORUS (ug/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

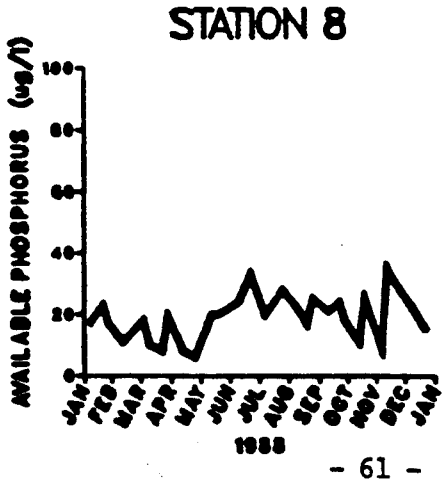

STATION 3a
AVAILABLE PHOSPHORUS (ug/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

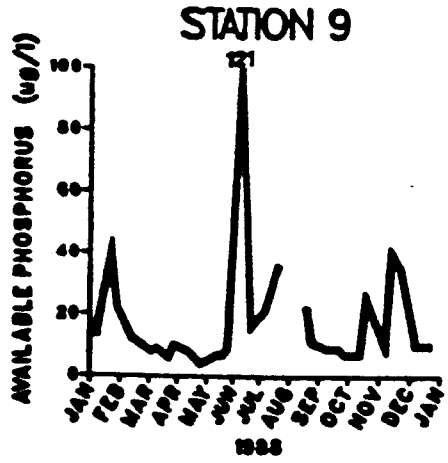

STATION 4
AVAILABLE PHOSPHORUS (ug/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

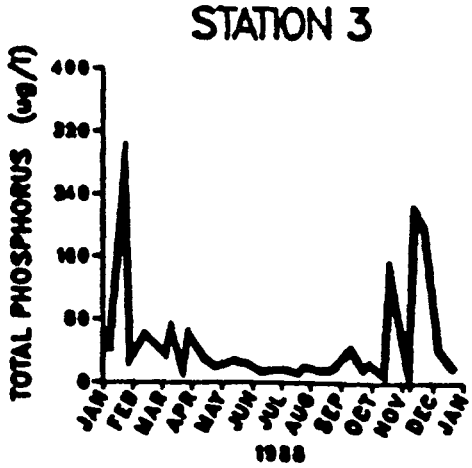

STATION 5
AVAILABLE PHOSPHORUS (ug/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

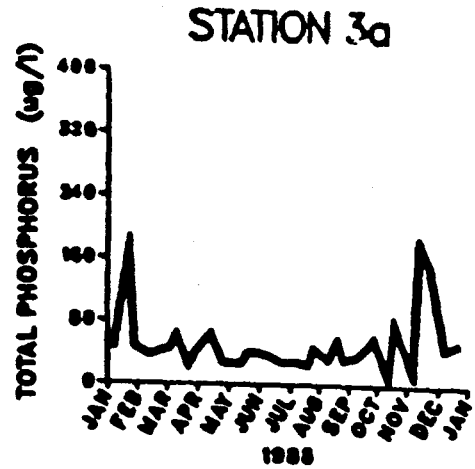

STATION 6
AVAILABLE PHOSPHORUS (ug/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

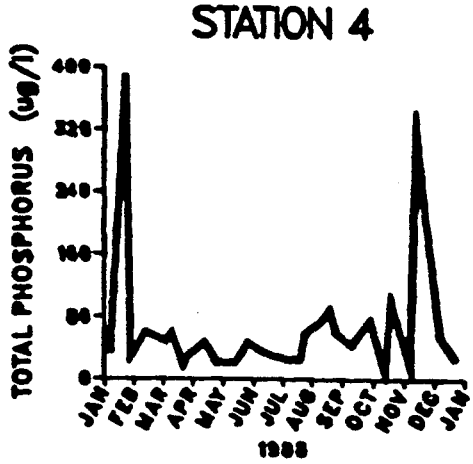

STATION 7
154
AVAILABLE PHOSPHORUS (ug/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

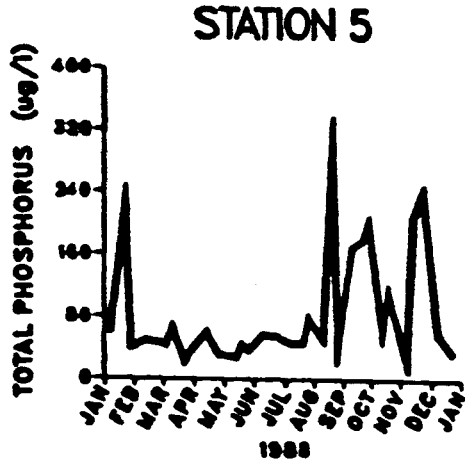

STATION 8
AVAILABLE PHOSPHORUS (ug/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

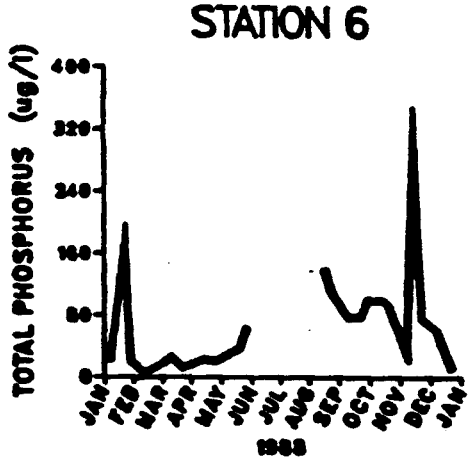

STATION 9
121
AVAILABLE PHOSPHORUS (ug/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

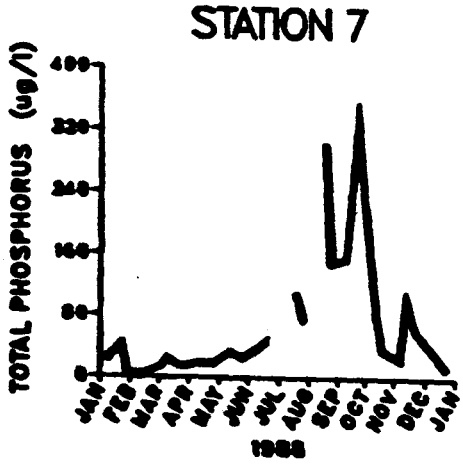

STATION 3
TOTAL PHOSPHORUS (ug/l)
400
320
240
160
80
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

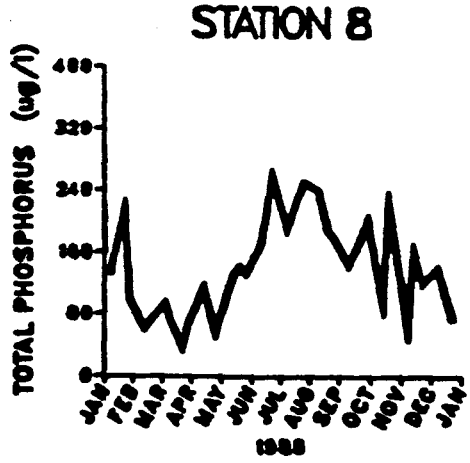

STATION 3a
TOTAL PHOSPHORUS (ug/l)
400
320
240
160
80
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

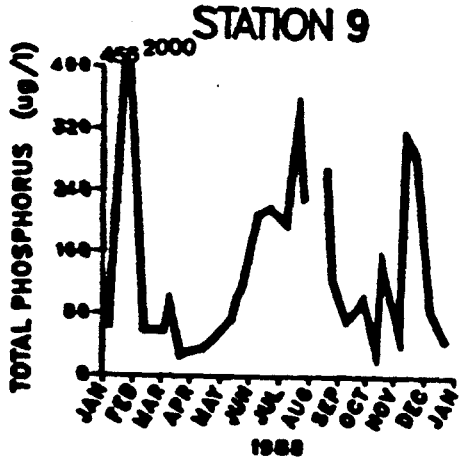

STATION 4
TOTAL PHOSPHORUS (ug/l)
400
320
240
160
80
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

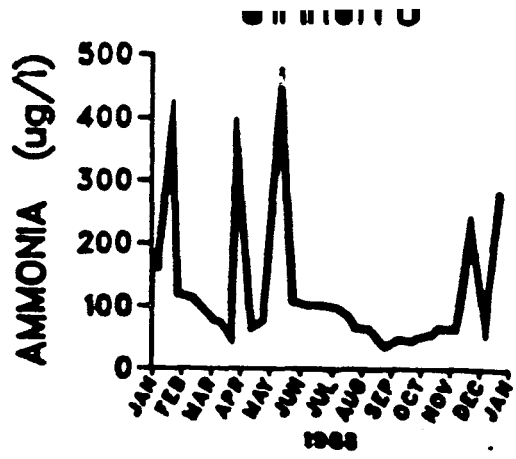

STATION 5
TOTAL PHOSPHORUS (ug/l)
400
320
240
160
80
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

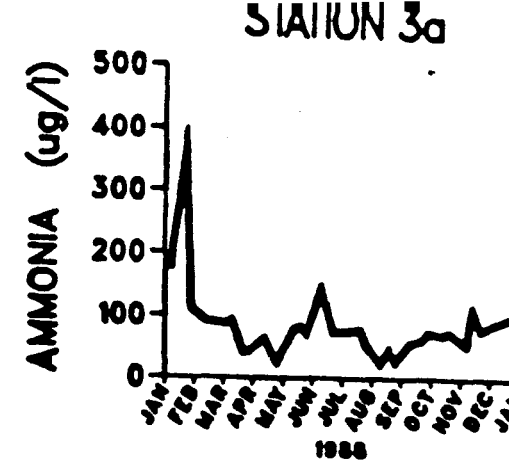

STATION 6
TOTAL PHOSPHORUS (ug/l)
400
320
240
160
80
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

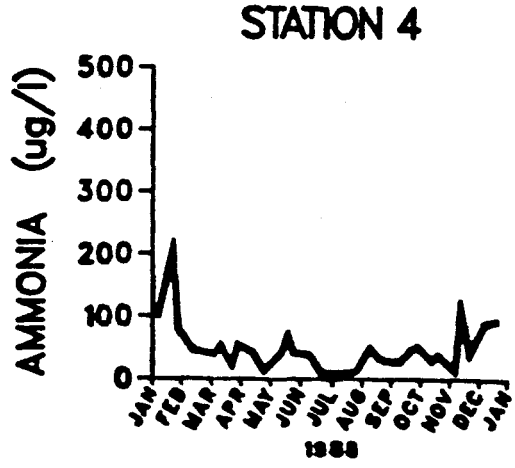

STATION 7
TOTAL PHOSPHORUS (ug/l)
400
320
240
160
80
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

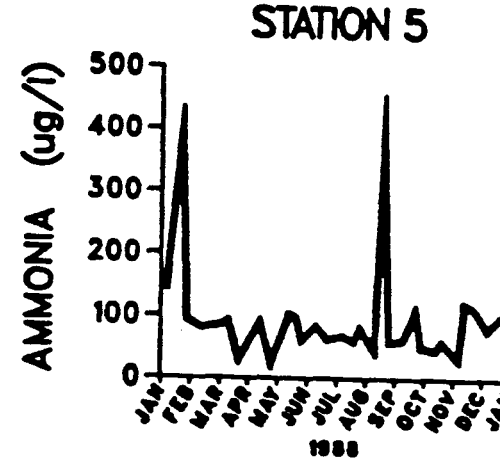

STATION 8
TOTAL PHOSPHORUS (ug/l)
400
320
240
160
80
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

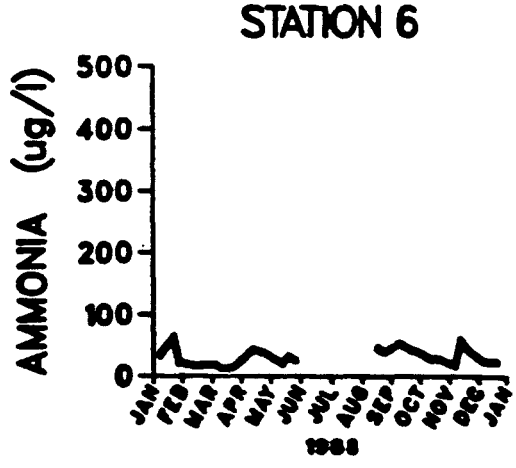

STATION 9
TOTAL PHOSPHORUS (ug/l)
2000
400
320
240
160
80
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

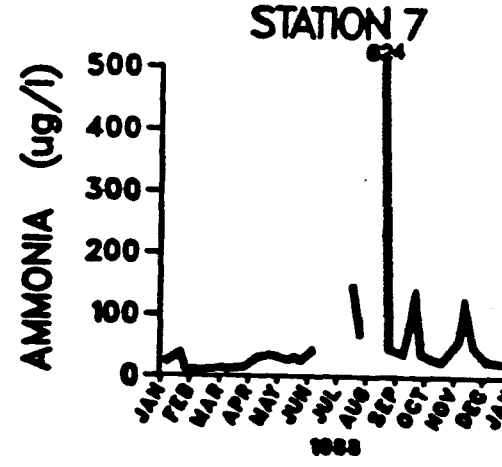

AMMONIA (ug/l)
500
400
300
200
100
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

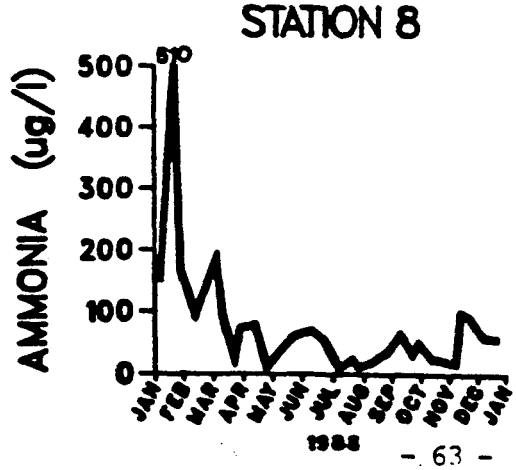

STATION 3a
AMMONIA (ug/l)
500
400
300
200
100
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

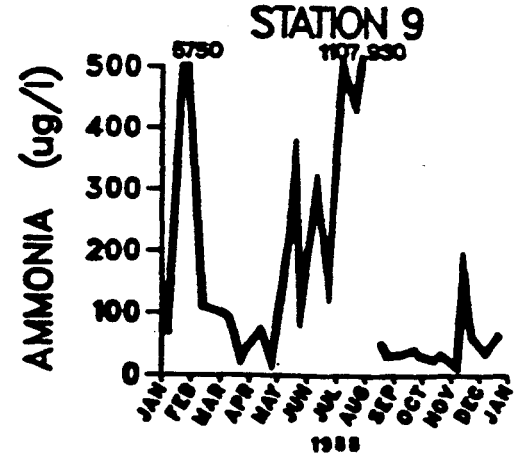

STATION 4
AMMONIA (ug/l)
500
400
300
200
100
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

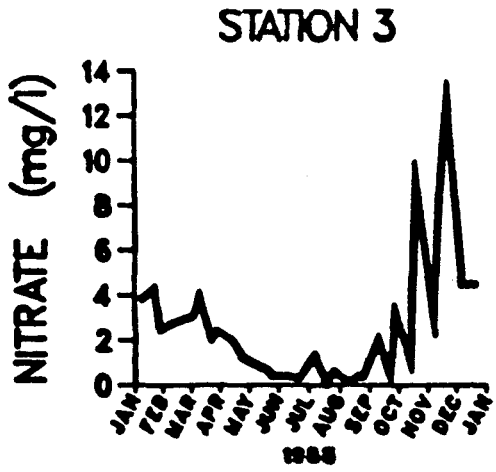

STATION 5
AMMONIA (ug/l)
500
400
300
200
100
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

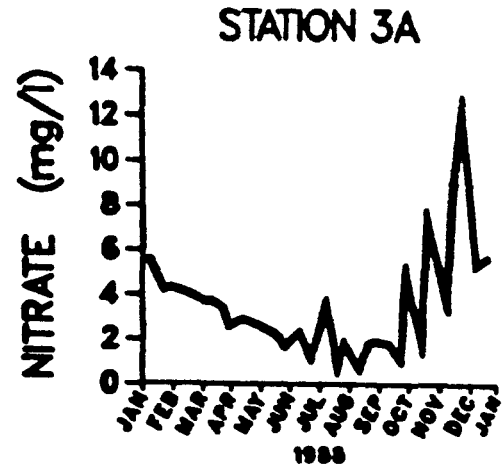

STATION 6
AMMONIA (ug/l)
500
400
300
200
100
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

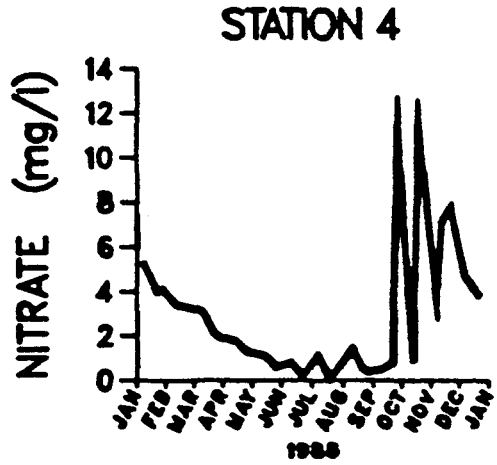

STATION 7
624
AMMONIA (ug/l)
500
400
300
200
100
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

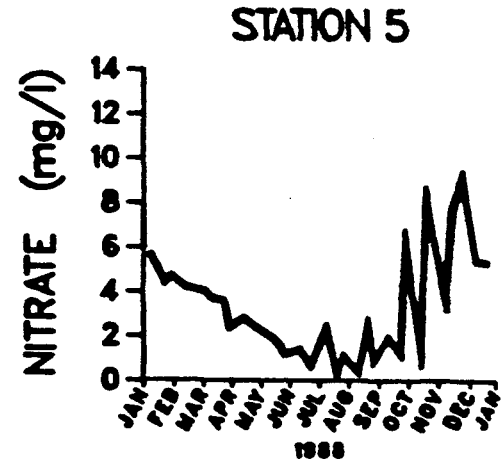

STATION 8
510
AMMONIA (ug/l)
500
400
300
200
100
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

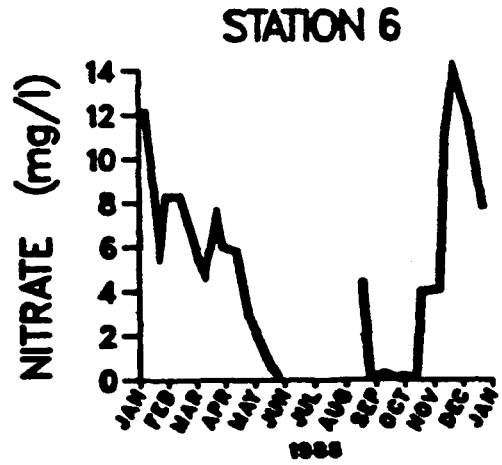

STATION 9
5750
1107,930
AMMONIA (ug/l)
500
400
300
200
100
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

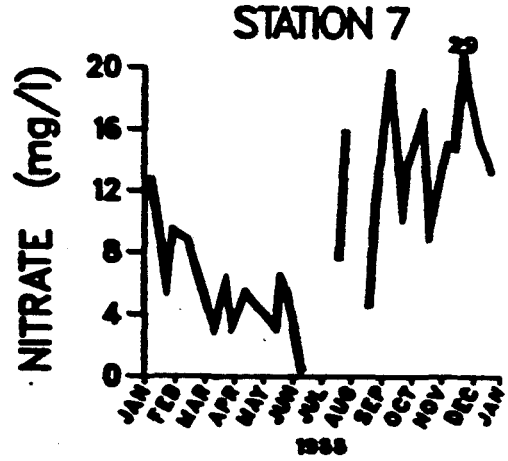

STATION 3
NITRATE (mg/l)
0
2
4
6
8
10
12
14
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

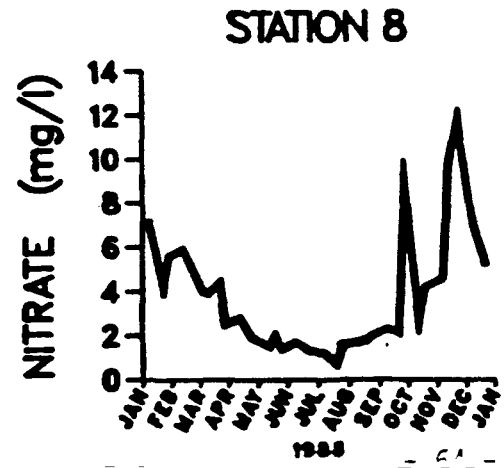

STATION 3A
NITRATE (mg/l)
0
2
4
6
8
10
12
14
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

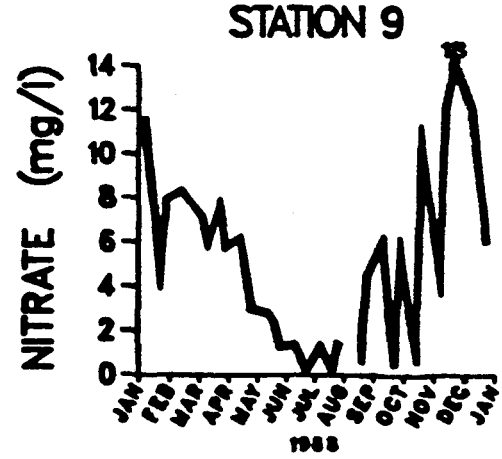

STATION 4
NITRATE (mg/l)
0
2
4
6
8
10
12
14
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

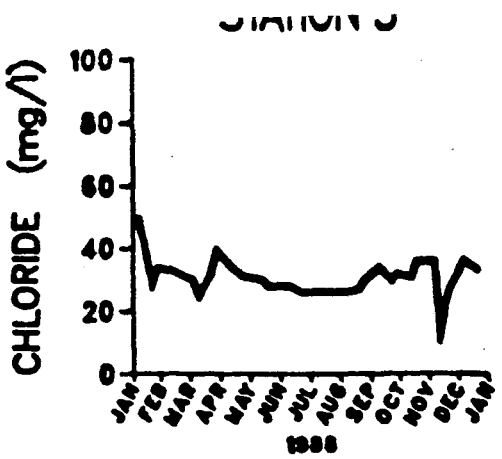

STATION 5
NITRATE (mg/l)
0
2
4
6
8
10
12
14
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

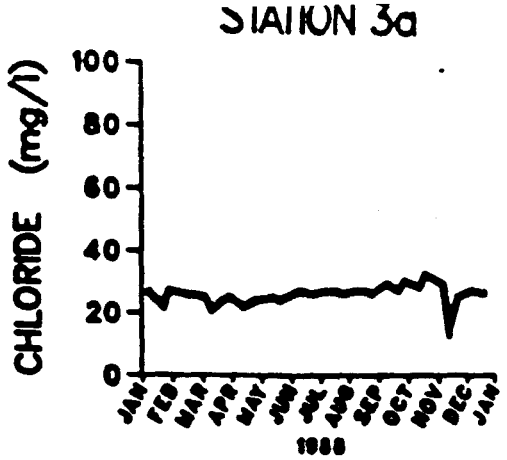

STATION 6
NITRATE (mg/l)
0
2
4
6
8
10
12
14
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

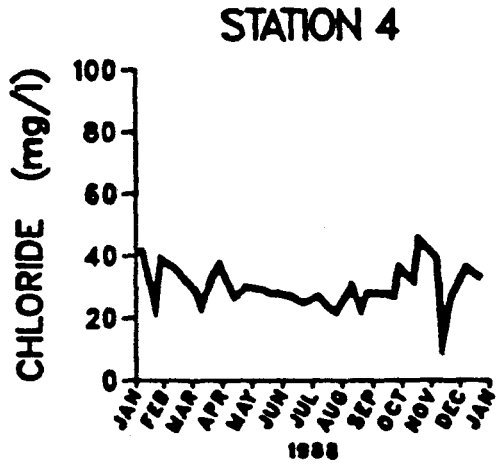

STATION 7
NITRATE (mg/l)
0
4
8
12
16
20
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

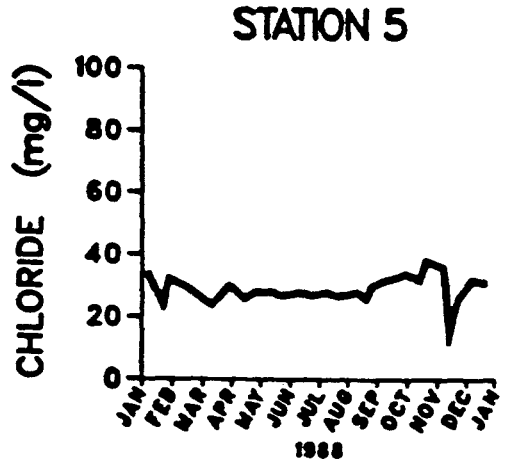

STATION 8
NITRATE (mg/l)
0
2
4
6
8
10
12
14
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

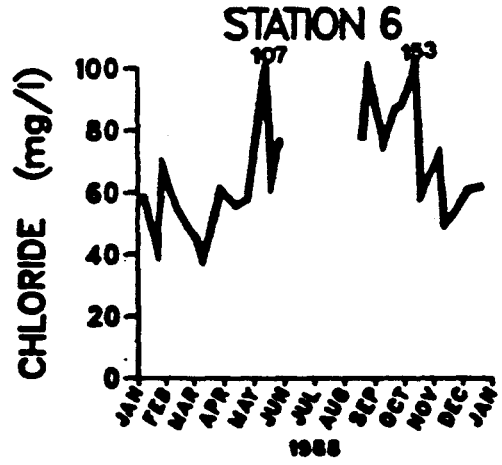

STATION 9
NITRATE (mg/l)
0
2
4
6
8
10
12
14
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

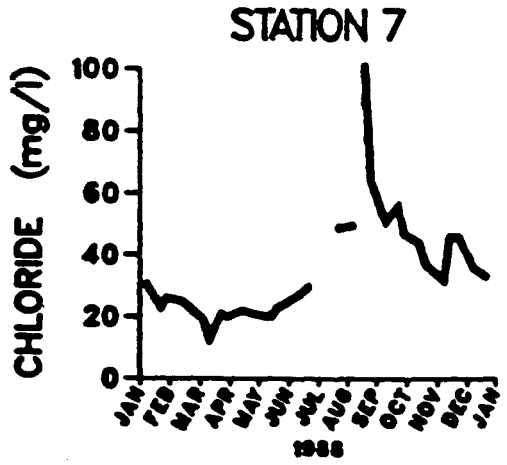

CHLORIDE (mg/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

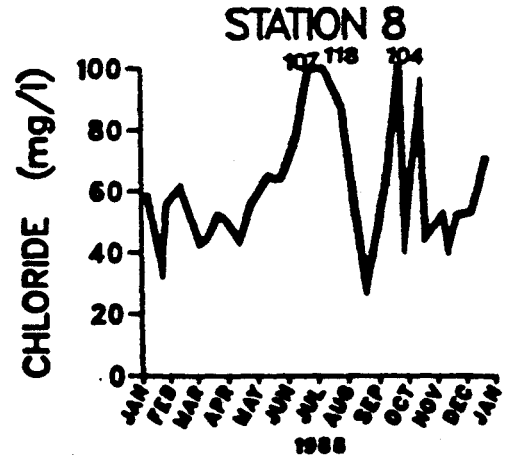

STATION 3a
CHLORIDE (mg/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

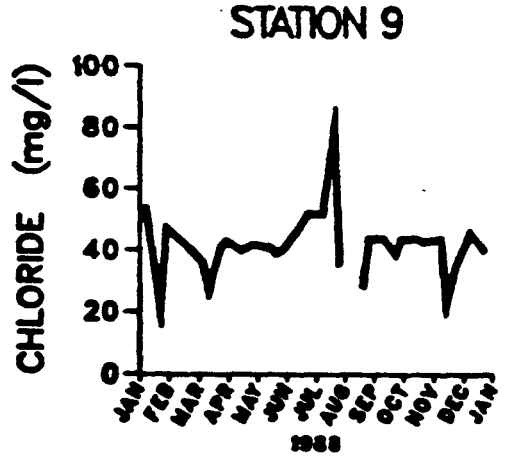

STATION 4
CHLORIDE (mg/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

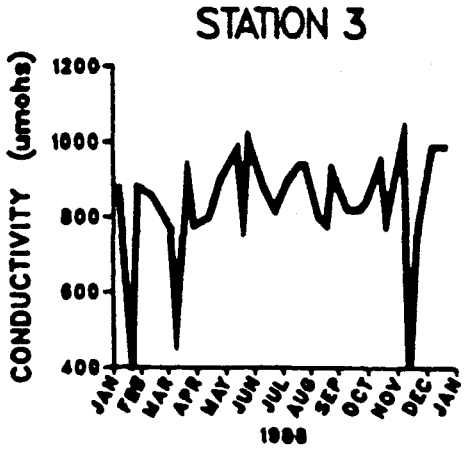

STATION 5
CHLORIDE (mg/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

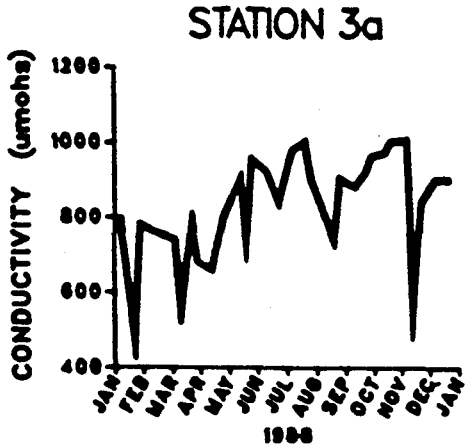

STATION 6
107
103
CHLORIDE (mg/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

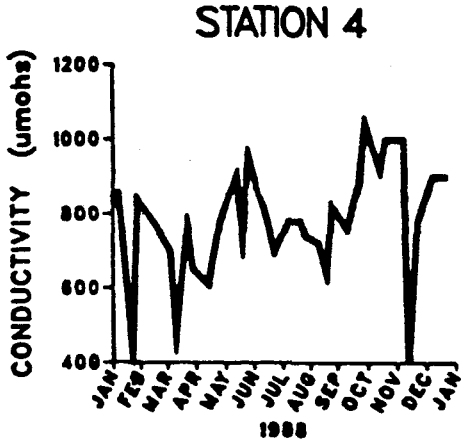

STATION 7
CHLORIDE (mg/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

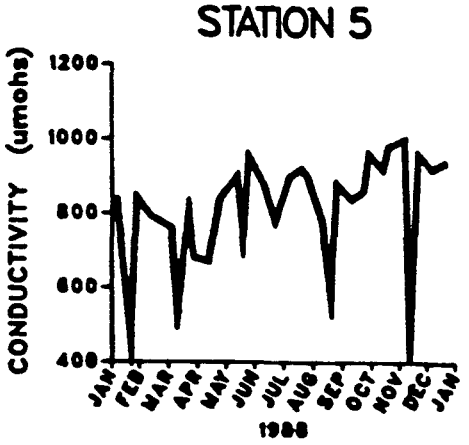

STATION 8
107
118
104
CHLORIDE (mg/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

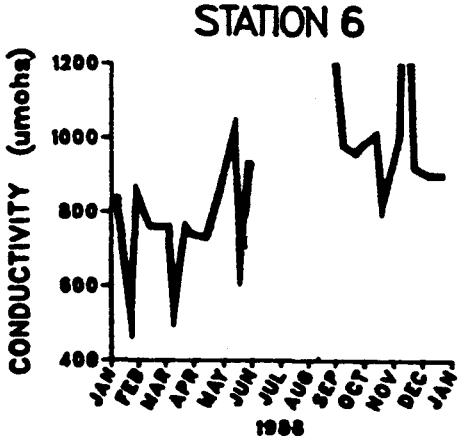

STATION 9
CHLORIDE (mg/l)
100
80
60
40
20
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

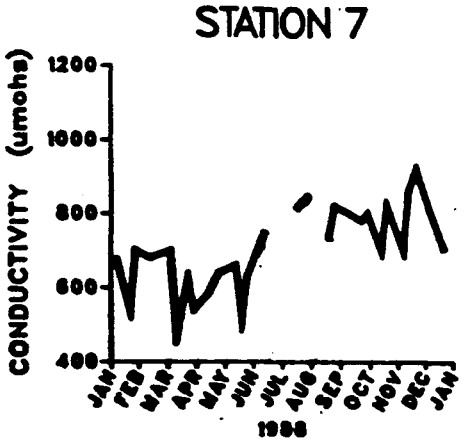

STATION 3
CONDUCTIVITY (umohs)
1200
1000
800
600
400
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

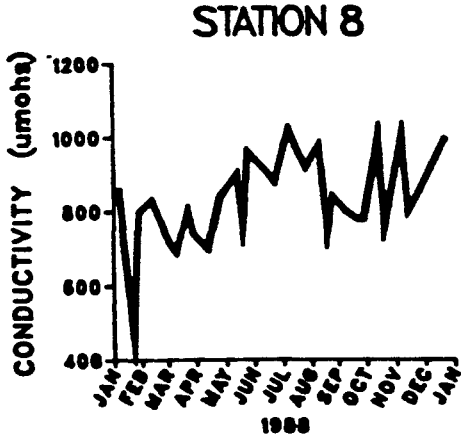

STATION 3a
CONDUCTIVITY (umohs)
1200
1000
800
600
400
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

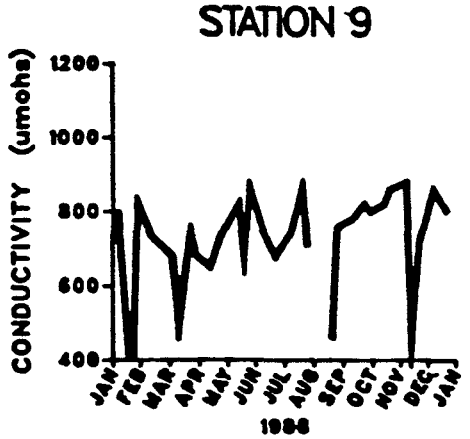

STATION 4
CONDUCTIVITY (umohs)
1200
1000
800
600
400
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988


STATION 5
CONDUCTIVITY (umohs)
1200
1000
800
600
400
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

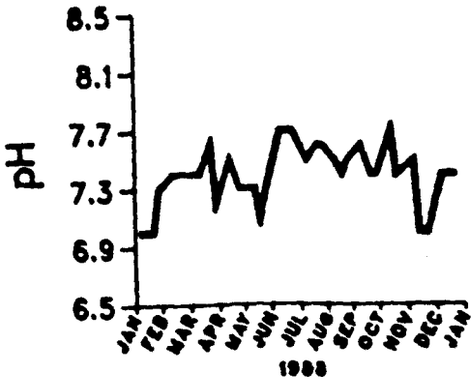

STATION 6
CONDUCTIVITY (umohs)
1200
1000
800
600
400
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988


STATION 7
CONDUCTIVITY (umohs)
1200
1000
800
600
400
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

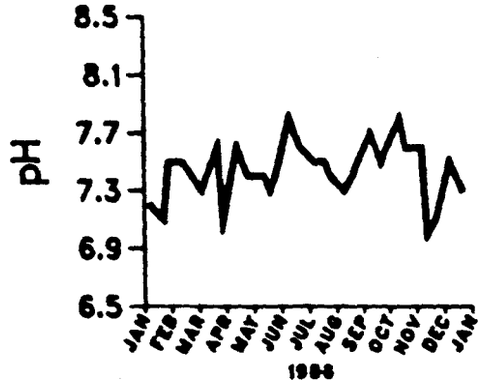

STATION 8
CONDUCTIVITY (umohs)
1200
1000
800
600
400
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988


STATION 9
CONDUCTIVITY (umohs)
1200
1000
800
600
400
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

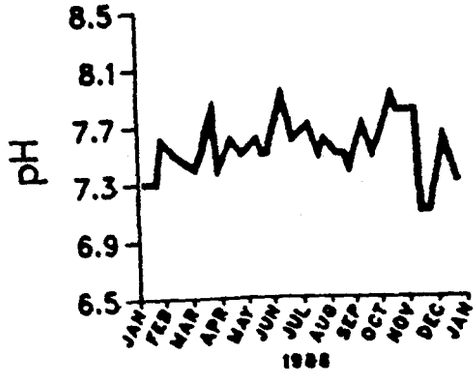
STATION 3



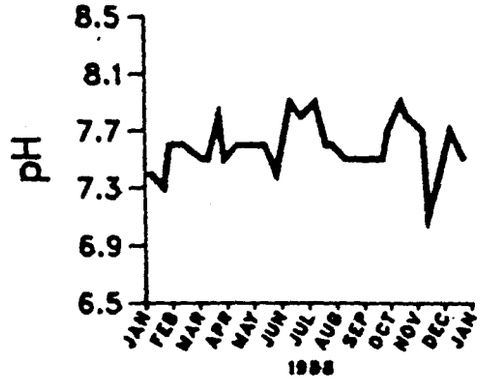
STATION 3a



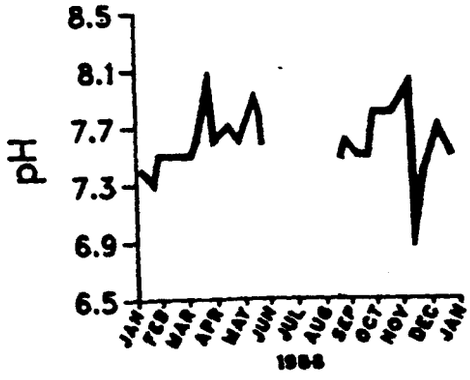
STATION 4



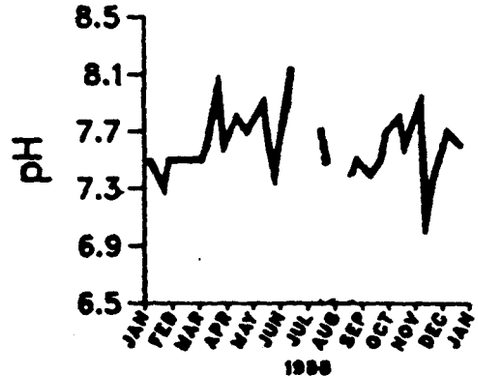
STATION 5



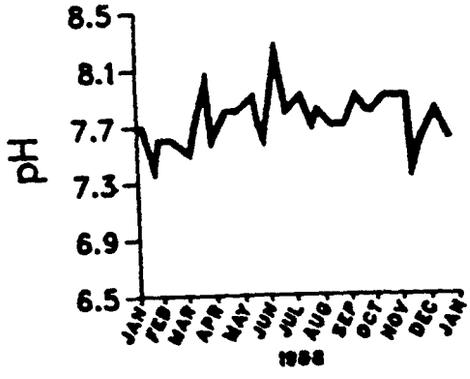
STATION 6



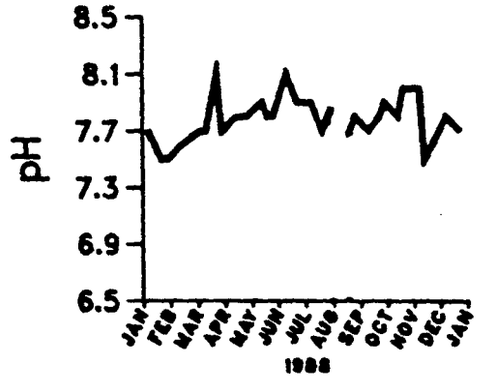
STATION 7

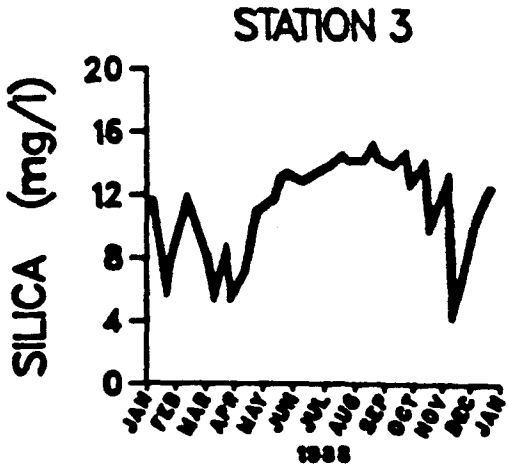


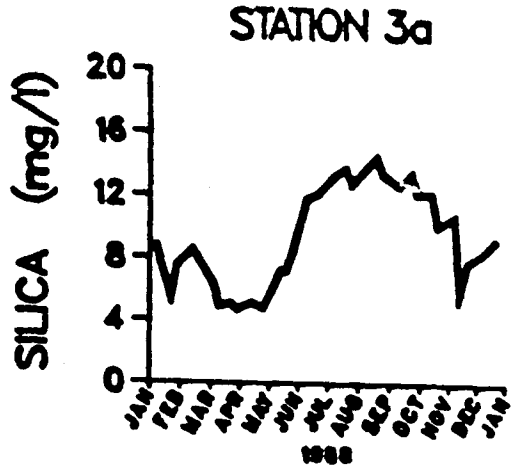
STATION 8

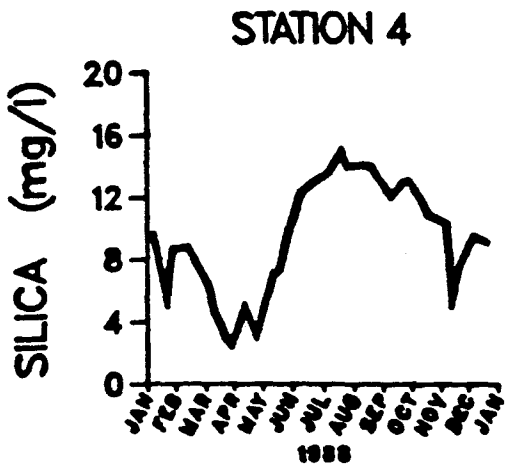


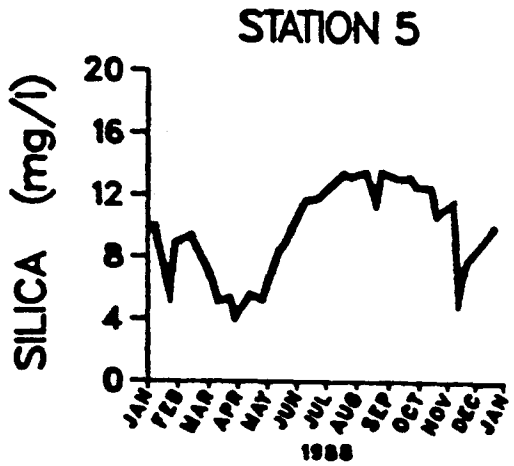
STATION 9

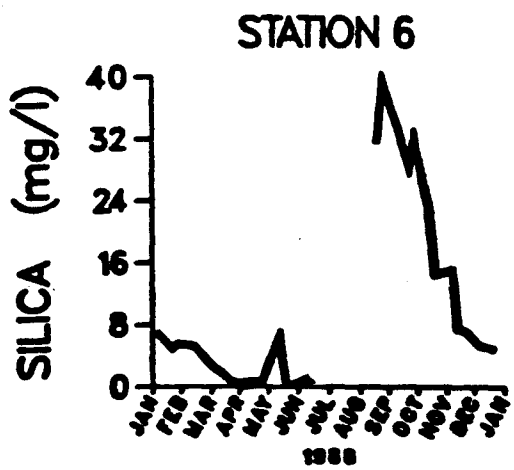


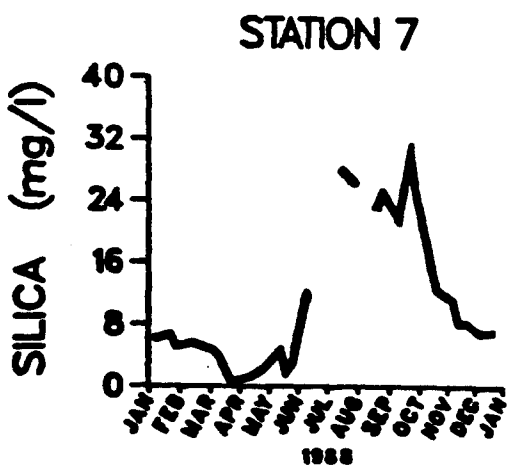

STATION 3
SILICA (mg/l)
20
16
12
8
4
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

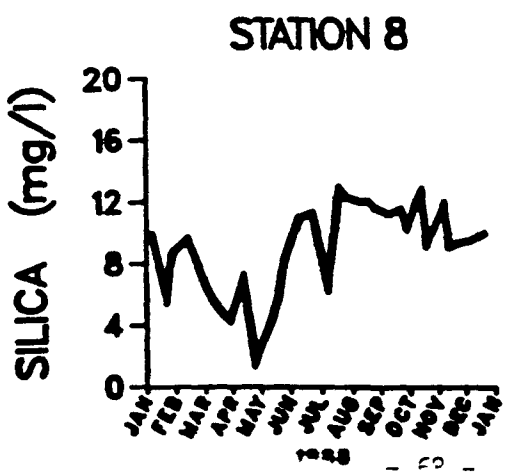

STATION 3a
SILICA (mg/l)
20
16
12
8
4
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

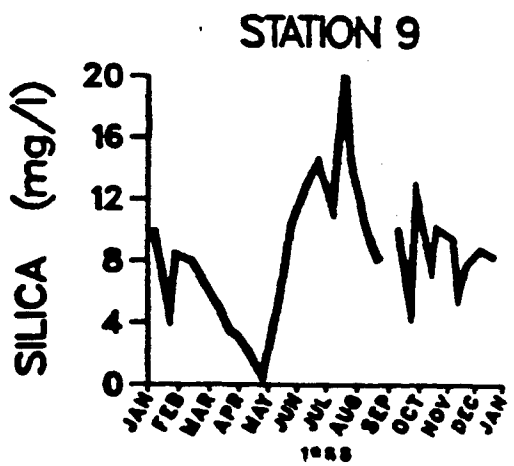

STATION 4
SILICA (mg/l)
20
16
12
8
4
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988


STATION 5
SILICA (mg/l)
20
16
12
8
4
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988

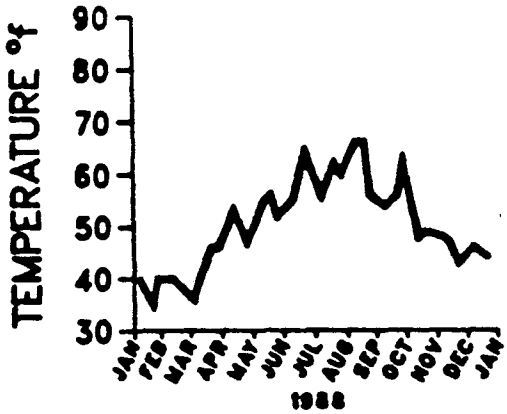

STATION 6
SILICA (mg/l)
40
32
24
16
8
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988


STATION 7
SILICA (mg/l)
40
32
24
16
8
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
1988


STATION 8
SILICA (mg/l)
20
16
12
8
4
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN


STATION 9
SILICA (mg/l)
20
16
12
8
4
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN

STATION 3



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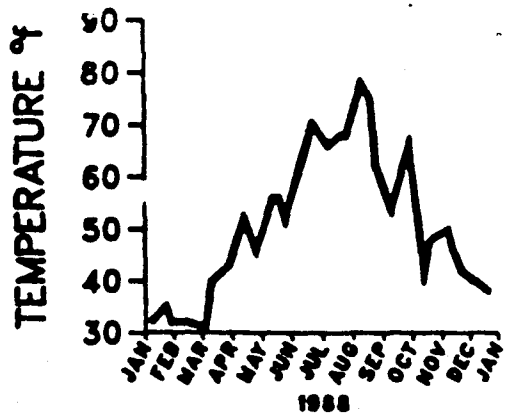

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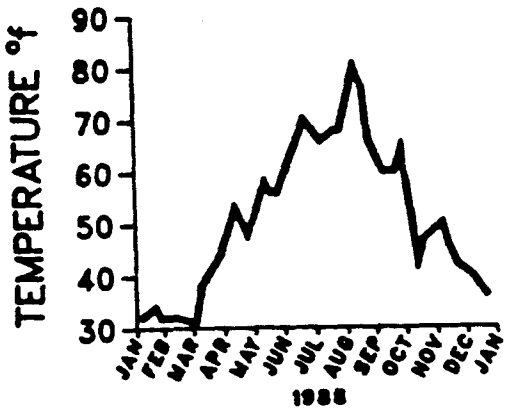

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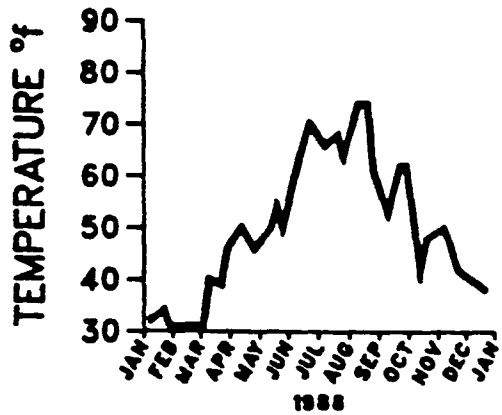

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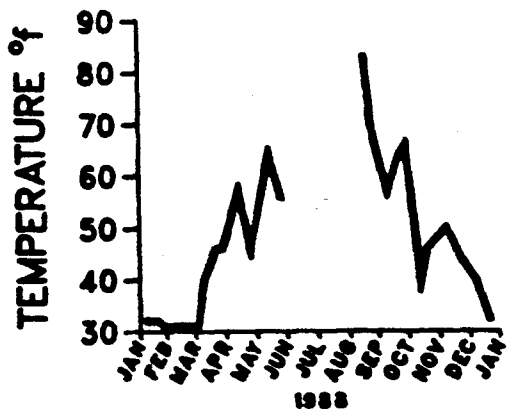

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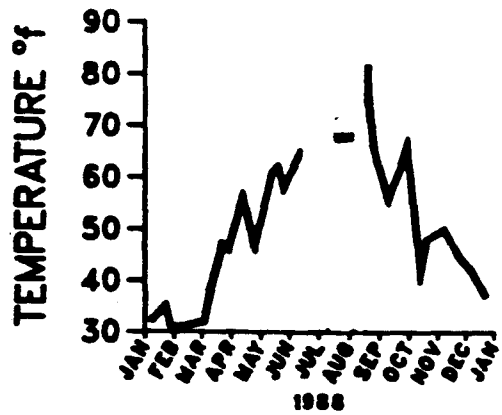

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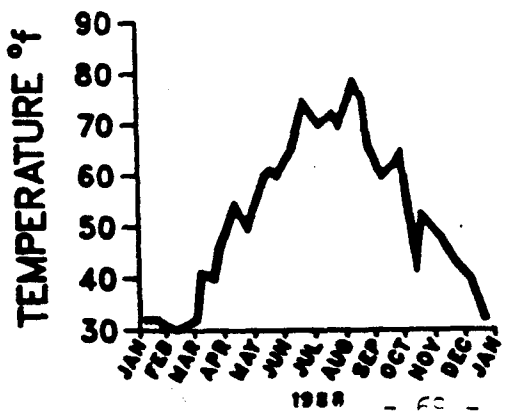

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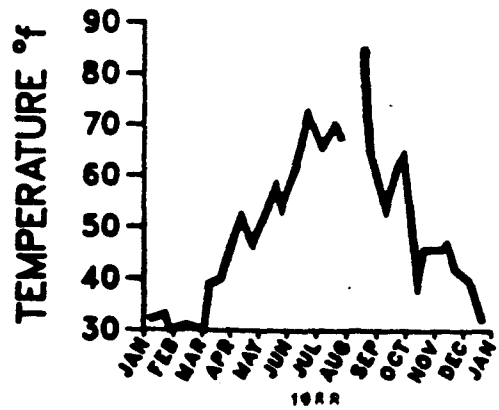

APPENDIX D

Seasonal Loadings by Station

Table . Seasonal loadings for station 3.

	Dec. 87-Feb. 88	Mar. 88-May 88	Jun. 88-Aug. 88	Sep. 88-Nov. 88
Suspended Solids (mt)	43.51	6.08	0.53	375.9
Ammonia-Nitrogen (mt)	0.072	0.049	0.011	0.165
Nitrate-Nitrogen (mt)	7.71	1.12	0.06	10.81
Sol. React. Phos. (mt)	0.031	0.002	0.001	0.063
Available Phos. (mt)	0.033	0.006	0.001	0.033
Total Phosphorus (mt)	0.130	0.019	0.002	0.207
Soluble Silica (mt)	7.08	2.80	2.07	8.65
Chloride (mt)	29.40	11.41	4.00	28.69
Discharge (10^6 m^3)	0.840	0.390	0.148	1.182

Table . Seasonal loadings for station 3A

	Dec. 87-Feb. 88	Mar. 88-May 88	Jun. 88-Aug. 88	Sep. 88-Nov. 88
Suspended Solids (mt)	751.00	272.63	9.52	2526.51
Ammonia-Nitrogen (mt)	3.245	0.740	0.103	1.559
Nitrate-Nitrogen (mt)	123.37	33.83	2.42	154.46
Sol. React. Phos. (mt)	0.547	0.065	0.011	0.900
Available Phos. (mt)	0.368	0.129	0.010	0.547
Total Phosphorus (mt)	2.095	0.513	0.046	2.532
Soluble Silica (mt)	128.19	56.28	17.27	124.29
Chloride (mt)	491.93	248.72	35.98	350.08
Discharge (10^6 m^3)	18.428	10.714	1.347	16.879

Table . Seasonal loadings for station 4.

	Dec. 87-Feb. 88	Mar. 88-May 88	Jun. 88-Aug. 88	Sep. 88-Nov. 88
Suspended Solids (mt)	313.21	10.31	0.30	1021.39
Ammonia-Nitrogen (mt)	0.164	0.025	0.001	0.245
Nitrate-Nitrogen (mt)	11.79	1.46	0.02	19.63
Sol. React. Phos. (mt)	0.112	0.005	0.001	0.282
Available Phos. (mt)	0.104	0.006	0.001	0.109
Total Phosphorus (mt)	0.494	0.026	0.001	0.751
Soluble Silica (mt)	11.40	2.59	0.30	16.78
Chloride (mt)	49.79	14.27	0.58	45.26
Discharge (10^6 m^3)	1.657	0.526	0.022	2.682

Table . Seasonal loadings for station 5.

	Dec. 87-Feb. 88	Mar. 88-May 88	Jun. 88-Aug. 88	Sep. 88-Nov. 88
Suspended Solids (mt)	2074.52	225.36	60.00	6557.15
Ammonia-Nitrogen (mt)	3.351	0.857	0.131	2.319
Nitrate-Nitrogen (mt)	151.79	36.23	1.74	165.17
Sol. React. Phos. (mt)	0.899	0.101	0.019	1.504
Available Phos. (mt)	0.773	0.140	0.018	0.888
Total Phosphorus (mt)	3.431	0.552	0.104	4.349
Soluble Silica (mt)	158.18	66.76	18.87	154.75
Chloride (mt)	652.24	305.35	41.49	465.04
Discharge (10^6 m^3)	20.913	11.613	1.504	21.324

Table . Seasonal loadings for station 6.

	Dec. 87-Feb. 88	Mar. 88-May 88	Jun. 88-Aug. 88	Sep. 88-Nov. 88
Suspended Solids (mt)	16.11	1.74	0.01	35.68
Ammonia-Nitrogen (mt)	0.031	0.014	0.001	0.041
Nitrate-Nitrogen (mt)	12.50	2.81	0.002	10.67
Sol. React. Phos. (mt)	0.037	0.004	0.001	0.061
Available Phos. (mt)	0.013	0.002	0.001	0.026
Total Phosphorus (mt)	0.118	0.013	0.001	0.153
Soluble Silica (mt)	8.15	1.02	0.09	7.02
Chloride (mt)	69.40	32.48	0.23	45.94
Discharge (10^6 m^3)	1.267	0.607	0.003	0.873

Table . Seasonal loadings for station 7.

	Dec. 87-Feb. 88	Mar. 88-May 88	Jun. 88-Aug. 88	Sep. 88-Nov. 88
Suspended Solids (mt)	6.04	4.33	1.17	5.46
Ammonia-Nitrogen (mt)	0.061	0.030	0.008	0.077
Nitrate-Nitrogen (mt)	27.11	6.62	0.65	22.09
Sol. React. Phos. (mt)	0.021	0.007	0.001	0.044
Available Phos. (mt)	0.012	0.005	0.001	0.020
Total Phosphorus (mt)	0.100	0.031	0.007	0.093
Soluble Silica (mt)	18.08	4.38	1.93	12.15
Chloride (mt)	85.74	29.52	3.79	51.37
Discharge (10^6 m^3)	2.758	1.561	0.089	1.160

Table . Seasonal loadings for station 8.

	Dec. 87-Feb. 88	Mar. 88-May 88-	Jun. 88-Aug. 88	Sep. 88-Nov. 88
Suspended Solids (mt)	1687.08	634.97	279.30	901.08
Ammonia-Nitrogen (mt)	6.833	1.771	0.146	1.143
Nitrate-Nitrogen (mt)	237.68	59.20	5.60	136.72
Sol. React. Phos. (mt)	1.931	0.377	0.182	0.701
Available Phos. (mt)	0.857	0.260	0.098	0.473
Total Phosphorus (mt)	5.453	1.619	0.825	2.781
Soluble Silica (mt)	289.86	100.51	42.10	171.72
Chloride (mt)	1699.81	920.25	303.22	894.27
Discharge (10^6 m^3)	36.959	18.738	3.758	17.646

Table . Seasonal loadings for station 9.

	Dec. 87-Feb. 88	Mar. 88-May 88	Jun. 88-Aug. 88	Sep. 88-Nov. 88
Suspended Solids (mt)	179.97	14.47	0.73	412.25
Ammonia-Nitrogen (mt)	1.078	0.081	0.013	0.161
Nitrate-Nitrogen (mt)	19.98	5.73	0.11	18.62
Sol. React. Phos. (mt)	0.335	0.023	0.004	0.127
Available Phos. (mt)	0.060	0.008	0.001	0.049
Total Phosphorus (mt)	0.681	0.058	0.007	0.385
Soluble Silica (mt)	13.87	4.28	0.49	10.21
Chloride (mt)	75.18	33.99	1.81	42.47
Discharge (10^6 m^3)	1.903	0.949	0.041	1.428

APPENDIX E

Annual Loadings by Station

Table . Annual Loadings for December 1987 to November 1988.

	Sta. 3	Sta. 3A	Sta. 4	Sta. 5	Sta. 6	Sta. 7	Sta. 8	Sta. 9
Suspended Solids ($mt\ yr^{-1}$)	426	3560	1345	8917	53	16	3502	604
Ammonia-Nitrogen ($mt\ yr^{-1}$)	0.30	5.65	0.43	6.66	0.09	0.18	9.89	1.33
Nitrate-Nitrogen ($mt\ yr^{-1}$)	19.7	314.1	32.9	354.9	26.0	56.5	439.2	44.4
Sol. React. Phos. ($mt\ yr^{-1}$)	0.10	1.52	0.40	2.52	0.10	0.07	3.19	0.49
Available Phos. ($mt\ yr^{-1}$)	0.07	1.05	0.22	1.82	0.04	0.04	1.69	0.12
Total Phosphorus ($mt\ yr^{-1}$)	0.36	5.19	1.27	8.44	0.28	0.23	10.68	1.13
Soluble Silica ($mt\ yr^{-1}$)	20.6	326	31.1	399	16.3	36.5	604	28.9
Chloride ($mt\ yr^{-1}$)	73.5	1127	110	1464	148	170	3818	153
Discharge ($10^6\ m^3\ yr^{-1}$)	2.56	47.4	4.89	55.4	2.75	5.57	77.1	4.32

APPENDIX F

Chemical Data for Well Studies

SALINE VALLEY WELL SAMPLES March 23, 1988

FILE=WELL032388	WELL A	WELL B	WELL C	WELL D	WELL E	WELL F	WELL G	WELL H	WELL I	WELL J	WELL K	WELL L
pH	7.2	7.4	7.4	7.2	7.1	7.3	7.2	-.-	7.4	7.4	7.5	7.2
CONDUCTIVITY (UMOHS)	1600	1600	1600	2000	1800	700	2200	---	1200	1000	600	1100
AMMONIA NITROGEN (UG/L)	12	24	21	47	46000	13	76	--	30	316	82	905
NITRATE NITROGEN (MG/L)	3.07	16.79	1.05	0.23	0.10	1.63	0.43	-.--	0.26	0.25	0.10	0.10
SOL. REACT. PHOS. (UG/L)	6	67	151	6	5	5	4	--	330	6	5	208
SILICA (MG/L)	12.3	17.6	23.6	23.4	33.6	17.2	18.3	--.-	13.0	15.3	20.4	15.3
CHLORIDE (MG/L)	309.6	156.8	218.4	267.3	89.0	3.1	254.6	--.-	89.3	136.9	8.7	100.0
WATER ELEVATION (FT)	97.38	92.61	93.99	75.26	75.10	74.95	96.13	--.--	93.45	--.--	--.--	--.--
TEMPERATURE (FAHRENHEIT)	44	46	44	52	51	49	44	--	44	62	51	42
TIME (HOURS)	0845	0900	0905	1005	1000	1015	1245	----	1255	0850	0945	1300

APPENDIX G

Best Management Practices Applied For, 1987

SALINE VALLEY PROJECT
RURAL CLEAN WATER PROGRAM

BEST MANAGEMENT PRACTICES INSTALLED

1988

STATION #3

DATE	BEST MANAGEMENT PRACTICES		AMOUNT
April	BMP-2	Animal Waste Management System - spreading plan	44 acres
May	BMP-8	Cropland Protective System - crop rotation plan	347.5 acres
May	BMP-9	Conservation Tillage	71.3 acres
August	BMP-11	Critical Area Seeding	1.8 acres
November	BMP-2	Animal Waste Management System - spreading plan	44 acres

STATION #3A

April	BMP-2	Animal Waste Management System - spreading plan	86.9 acres
May	BMP-8	Cropland Protective System - crop rotation plan	618.8 acres
May	BMP-9	Conservation Tillage	239.7 acres
May	BMP-1	Permanent Vegetative Cover - Pasture & Hayland Mgt.	116.3 acres
August	BMP-11	Critical Area Seeding	.3 acres
Sept.	BMP-7	Grassed Waterway	.5 acres
Novem.	BMP-2	Animal Waste Management System - spreading plan	86.9 acres

STATION #4

April	BMP-2	Animal Waste Management System - spreading plan	70.4 acres
May	BMP-8	Cropland Protective System - crop rotation plan	144.4 acres
May	BMP-9	Conservation Tillage	85.8 acres
May	BMP-1	Permanenet Vegetative Cover - Pasture & Hayland Mgt.	15.7 acres
August	BMP-2	Animal Waste System	1 No.
Nov.	BMP-2	Animal Waste Management System - spreading plan	70.4 acres

STATION #5

May	BMP-8	Cropland Protective System - crop rotation plan	542.2 acres
May	BMP-9	Conservation Tillage	174.9 acres
Nov.	BMP-2	Animal Waste System	1 No.

STATIONS 6 & 7

NO BMP's ESTABLISHED, ALL CONTRACTS COMPLETED

STATION #9

April	BMP-2	Animal Waste Management System - spreading plan	418.5 acres
May	BMP-8	Cropland Protective System - crop rotation plan	1,205.2 acres
May	BMP-9	Conservation Tillage	314.4 acres
May	BMP-1	Permanent Vegetative Cover - Pasture & Hayland Mgt.	14.3 acres
Sept.	BMP-7	Grassed Waterway	1.2 acres
Oct.	BMP-8	Cropland Protective System - cover & green manaure crop	8.1 acres
Nov.	BMP-2	Animal Waste Management System - spreading plan	418.5 acres