PHYSICAL AND CHEMICAL DATA FOR THE SACRAMENTO RIVER AT RIO VISTA, CALIFORNIA, NOVEMBER 1983 THROUGH NOVEMBER 1984

Allan Y. Ota, Laurence E. Schemel, Stephen W. Hager, and Dana D. Harmon

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ABSTRACT

Physical and chemical data for the Sacramento River at Rio Vista, California, for the period of November 1983 through November 1984 are presented in this report. Measurements include specific conductance, alkalinity, suspended particulate matter, and the dissolved inorganic nutrients: nitrite, nitrate + nitrite, ammonium, dissolved silica, and ortho-phosphate. Numerical results are tabulated and details of the methods are described.

INTRODUCTION

The biogeochemistry of waters in the Northern San Francisco Bay estuary is influenced by variability in the flow rate and the chemical composition of the freshwater (Schemel et al., 1984). From 1 November 1983 through 30 November 1984, a field sampling and analysis program was conducted to characterize variations in the geochemistry of the inflow of the Sacramento River, the major inflow to San Francisco Bay (fig. 1). The study encompassed periods of high and low seasonal inflows (fig. 2). This report presents physical and chemical data for the Sacramento River at Rio Vista measured during this study. Measurements included specific conductance, alkalinity, suspended particulate matter (SPM), and the dissolved inorganic nutrients: ammonium, nitrite, nitrate + nitrite, dissolved silica, and ortho-phosphate. The scientific personnel and their primary areas of responsibility are listed in Table A.

EXPERIMENTAL DESIGN

Flow rates, chemical and biological properties, and sediment transport characteristics have been studied in several reaches and tributaries of the Sacramento River. During the period of this study, several locations in the tidal river downstream of the city of Sacramento were monitored at two-week to monthly intervals by the U. S. Geological Survey and the California Department of Water Resources. Much of this monitoring is conducted to assure compliance with water quality standards. The frequencies and natures of these monitoring programs do not allow resolution of chemical variability on time scales of days to weeks. During periods of high river flow, generally late-fall to early-spring, large changes in river chemical composition are caused by or related to short-term variations in river flow rate. To resolve these variations, the Sacramento River was sampled one to two times daily in this study. The sampling location, Rio Vista, was

selected primarily so that we could characterize the chemistry of the Sacramento River inflow to Northern San Francisco Bay during periods of high inflow. This required a sampling location below the point where water from the Yolo Bypass joins the Sacramento River. The mid-span of the Rio Vista bridge satisfied this requirement (fig. 1).

Preliminary analysis of hourly (instantaneous) specific conductance measurements from Rio Vista (Bureau of Reclamation, Sacramento, California, unpublished data) indicated that large variations can occur over shorter than daily time scales during periods of high flow. Consequently, our daily measurements presented here might not represent mean daily concentrations. This is acceptable because mixing processes in the estuary probably remove (smooth) effects of short term variability in the river inflow (Loder and Reichard, 1980).

MATERIALS AND METHODS

Depth-integrated samples were collected from the midspan of the Rio Vista Bridge with a point-integrating sampler, US-P-72 (fig. 3). A one-liter linear polyethylene sample bottle was used in the sampler. The sampler collected water from one meter above the bottom to one meter below the surface. In order to avoid overfilling, and thus excluding water from shallow depths, the rate of retrieval of the sampler from depth was adjusted according to river flow rate. The sampling prodecure was performed once per day. In addition, on one day each week, three additional sample bottles were collected. One of the four samples was stored in a refrigerator at Rio Vista until the following sample pick-up (usually seven days later). The three remaining samples were composited. The composite sample and the routine daily samples were subdivided for SPM and dissolved inorganic

nutrient analysis. After analysis, the composite sample was compared to the stored sample, to determine storage effects for each of the analyses. Theoretically, ammonium would be the nutrient most affected by storage. Effect of storage on nutrients for this study is illustrated in the plot of fresh versus refrigerated ammonium concentrations (fig. 4). Samples for alkalinity and specific conductance were collected with a bucket from surface waters and stored in amber polyethylene bottles until delivered to the laboratory.

Sample Preparation and Analysis

Dissolved nutrients. Samples were filtered through a Sartorius[1] polycarbonate filter holder containing a 47 mm, 0.4 um poresize Nuclepore polycarbonate membrane filter. The vacuum was maintained at or below 17 kPa. The filtered samples were stored in 30 ml amber Nalgene linear polyethylene bottles that had been preconditioned by storing them filled with 2.5 meq. bicarbonate water. Samples were frozen until time of analyses. The samples were stored frozen from one to four weeks. Silica polymerizes when frozen (Grasshoff, 1976). In order to completely return the polymerized

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[1]The mention of brand names is for identification purposes and does not constitue endorsement by the U. S. Geological Survey.

silica to solution, the samples were allowed to thaw at room temperature for a minimum of 12 hours. After thawing and before analysis each sample was vigorously shaken.

The dissolved inorganic nutrients ammonium, nitrite, nitrate, ortho-phosphate and silica were analyzed on a Technicon Auto Analyzer II system modified for estuarine conditions. Samples were referenced to upscale standards and to blanks that were analyzed at two to four hour intervals. Artificial river water (1.0 meq. L^{-1} NaHCO3) and artificial seawater (Strickland and Parsons, 1968) were used as standards. The analyses were linear over the concentration ranges measured in the San Francisco Bay and Delta system.

The five analyses were maintained at 37°C by a circulator that continuously pumped 37°C water through specially designed glass heating tubes inserted into the glass mixing coils of each manifold.

Ammonium. The ammonium method was an automated adaptation of the phenolhypochlorite method of Solorzano (1969), similar to that of Head (1971). By using a heating bath temperature of 37° C, as recommended by Berg and Abdullah (1977), and by increasing reaction time with the addition of mixing coils, the method gives maximum color development, low blanks, and a high degree of reproducibility. The effect of salinity was minimized by reducing the amount of hypocholorite in the oxidizing reagent. Estimated precision for the range of concentrations measured was + or -0.2 ug-at L^{-1}.

Nitrite. The nitrite method was an adaptation of Technicon (1973) method number AII-100-70W, with the cadmium column removed. The nitrite sample-ammonium chloride mixture was drawn from the debubbler which precedes

the cadmium column in the nitrate + nitrite analysis in order to allow all five analyses to operate from a single Technicon proportioning pump. Estimated precision for the range of concentrations measured was + or -0.05 ug-at L^{-1}.

Nitrate + nitrite. The nitrate + nitrite method was adapted from Technicon (1973) method number AII-100-70W with one additional twenty-turn coil added to increase reaction time for better color stability. Furthermore, 0.121g of copper sulfate was added to 200g of ammonium chloride in 18 L of deionized distilled water (Connors and Beland, 1976). The pH of this reagent was not adjusted. The copper sulfate reduced cadmium column deterioration. Estimated precision for the range of concentrations measured was + or -0.1 ug-at L^{-1}.

Dissolved Silica. The silicate method was an adaptation of Technicon (1976) method AII-105-71W. A sample tube with half of the original delivery rate was used to extend the linear range to 350 ug-at L^{-1}. To increase reaction time for maximum color development, mixing coils were added before the addition of the oxalic acid and after the addition of ascorbic acid. Estimated precision for the range of concentrations measured was + or -1 ug-at L^{-1}.

Ortho-phosphate. The ortho-phosphate method was a modification of Atlas et al. (1971) using ascorbic acid (70 g L^{-1} with 50 mL acetone L^{-1}) as a reducing agent. This modification allows analysis of samples predigested with hydrogen peroxide and ultraviolet light. To increase reaction time for maximum color development, mixing coil lengths were increased by a factor of 2. Estimated precision for the range of concentrations measured was + or -0.05 ug-at L^{-1}.

Suspended particulate matter. The concentration of suspended particulate matter (SPM) was determined gravimetrically. An aliquot of sample water was vacuum filtered through a preweighed 47 mm, 0.45 um pore size Selas Flotronics silver filter. The filter was air dried for a minimum of 4 weeks, then reweighed. Mean and median deviations of the SPM analysis are typically 1.4 mg L^{-1} and 0.9 mg L^{-1} (Hager and Harmon 1984).

Specific conductance and alkalinity. Specific conductance and alkalinity were determined on a surface sample taken with a plastic bucket. The alkalinity-salinity sample was stored in a plastic quart bottle for less than 24 hours before sample processing. An unfiltered aliquot was transferred to a 250 ml glass bottle with poly-seal cap for later specific conductance determination. Alkalinity samples were stored in 250 mL wide-mouth plastic bottles after filtration through glass fiber filters. Filters were pre-rinsed twice with sample water before the aliquot for analysis was taken. Alkalinity samples were stored at room temperature in the dark for periods ranging from a few days to months. Effects of sample storage were not tested. Results of Brewer and Goldman (1976) and Goldman and Brewer (1980) indicate that the changes in total alkalinity probably would be less than 0.050 meq. L^{-1}.

Specific conductance. Specific conductance was determined at 25° C with an inductive bench salinometer (Beckman Model RS7B) relative to standard seawater (I.A.P.S.O., P92). The sensitivity of the instrument indicates a precision on the order of about 5 uS cm^{-1} or less.

Alkalinity. Alkalinity was determined by Gran titration at 25°C. The method and apparatus are the same as that described by Schemel (1984) with

the exception that a Brinkman semi-automated buret was used to add 0.010 mL aliquots of 0.5N HCl to the samples. The digital output of the buret was modified, as described in the instruction manual, so that titrant volumes could be determined to 0.0001 mL. Bicarbonate end points were usually reached with 0.3 - 0.4 mL of titrant. The largest error in the analysis is in the determination of the titrant concentration; we estimate this uncertainty to be about 0.0001 meq. L^{-1}. Other errors are the same as those described by Schemel (1984).

DATA

The data are presented in chronological order in Table D.

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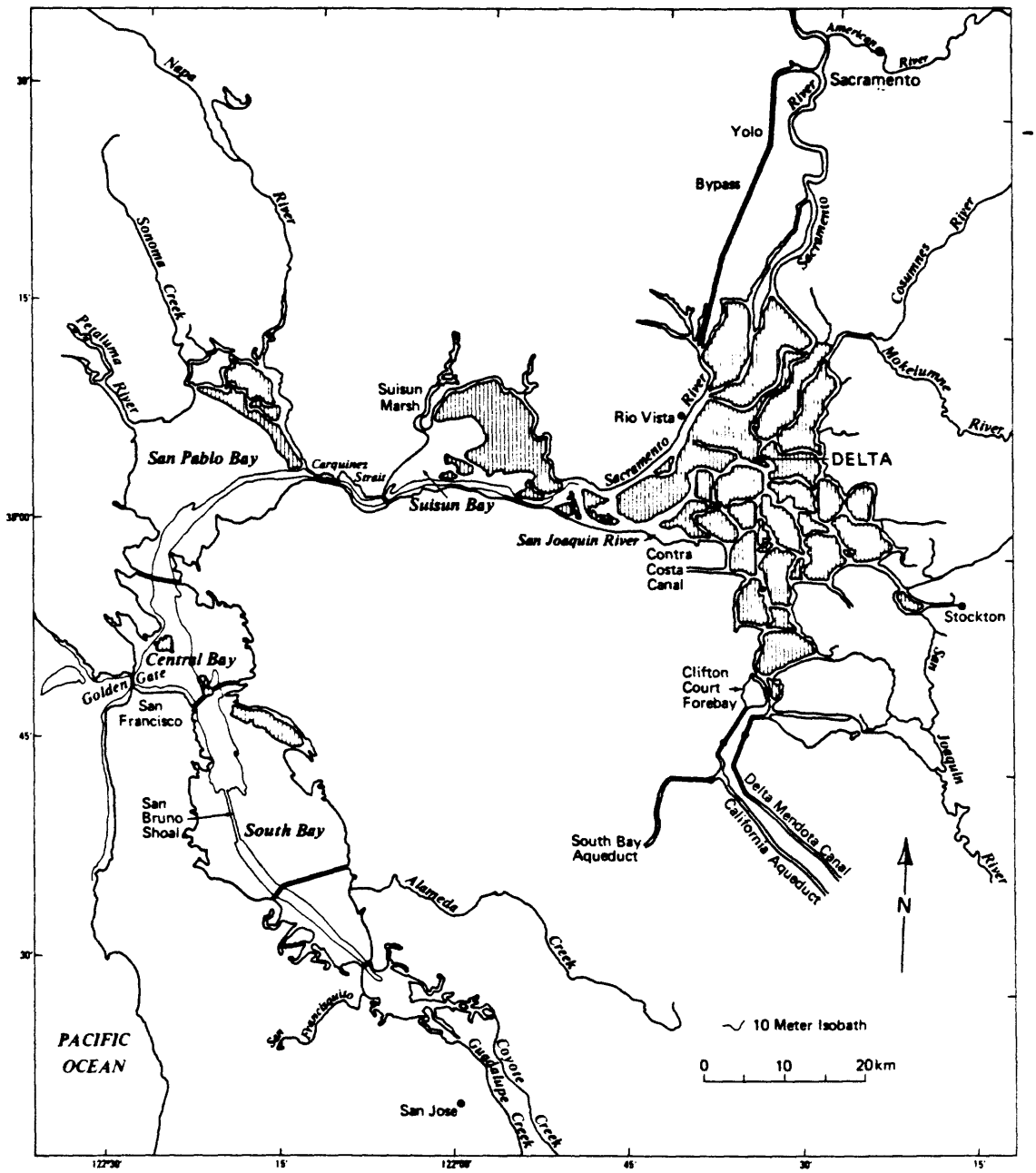

Figure 1. Sacramento River and environs from city of Sacramento to confluence with San Joaquin River.

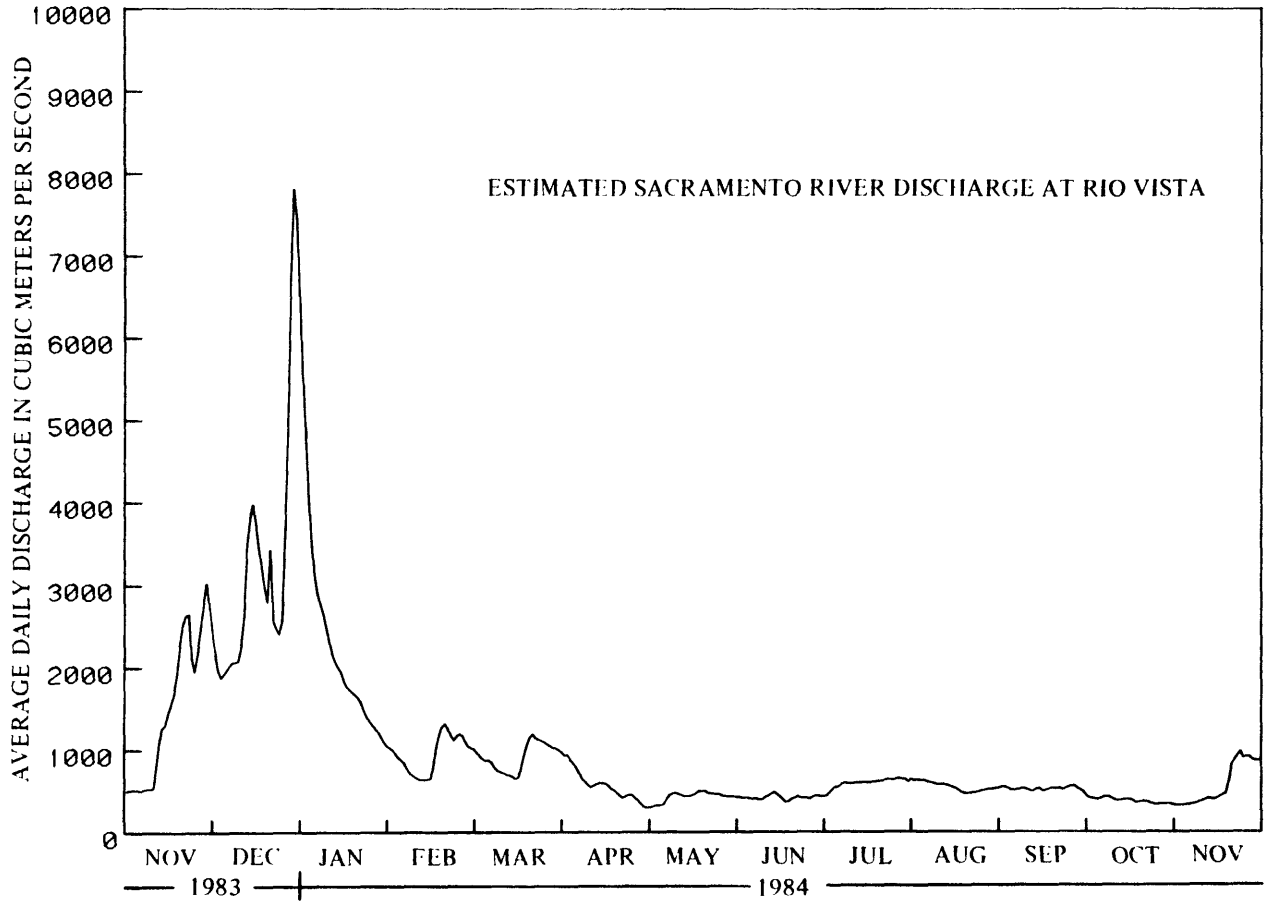

Figure 2. Estimates of daily Sacramento River discharge at Rio Vista, California, for November 1983 through November 1984. Estimates are the sum of Sacramento River discharge at Freeport plus Yolo Bypass discharge at Woodland (U. S. Geological Survey District Office, Sacramento, California).

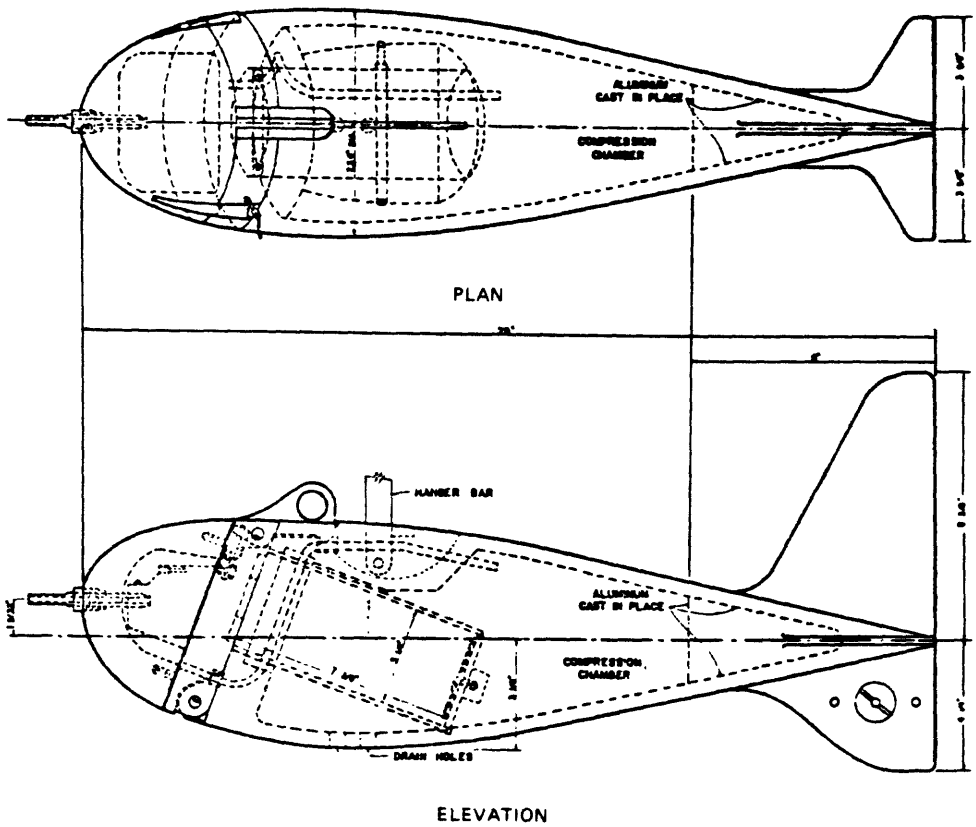

Figure 3. Point-integrating water and suspended sediment sampler.

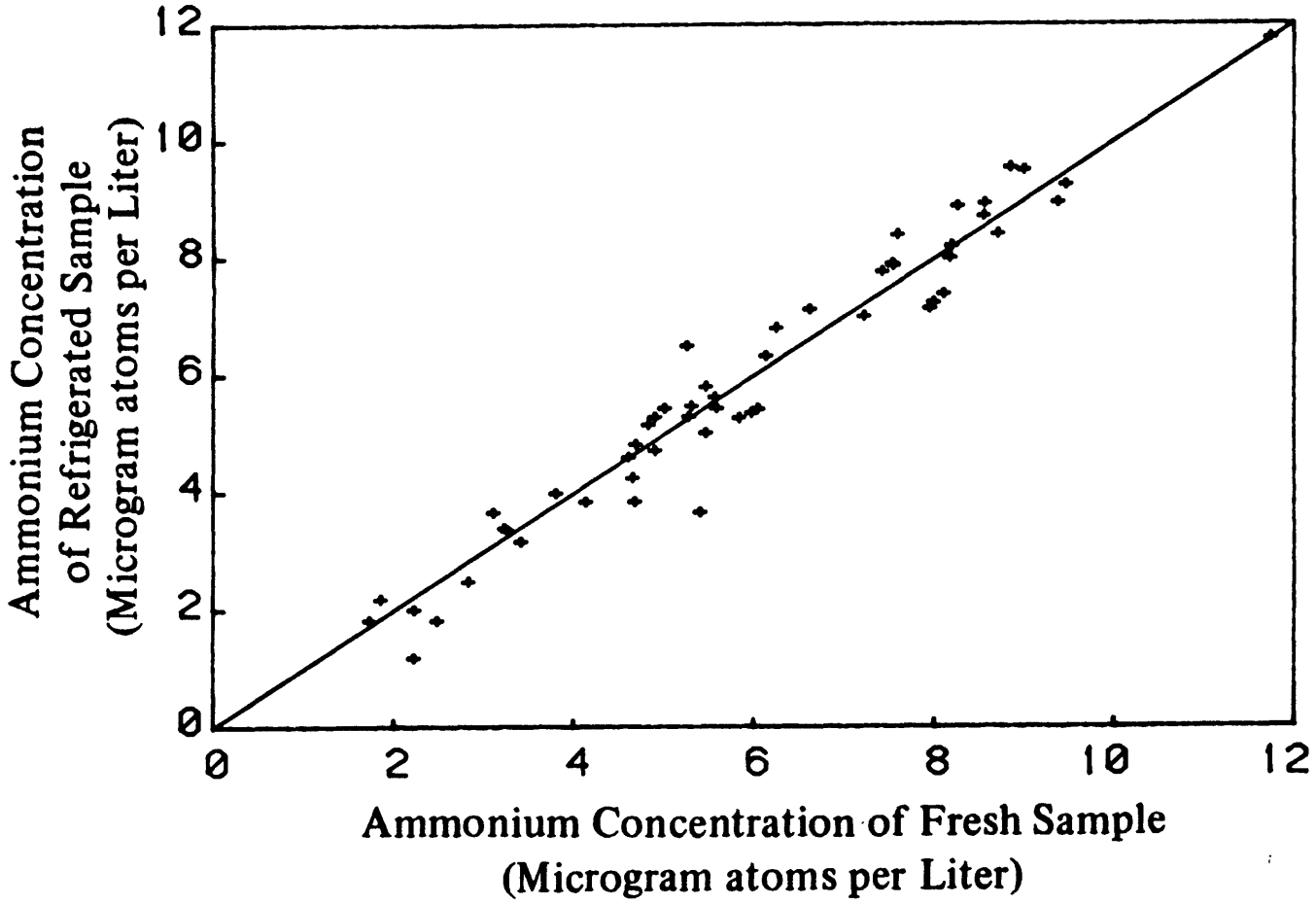

Figure 4. Storage effect on ammonium analyses.

TABLE A
List of Scientific Personnel

Stephen W. Hager	Dissolved nutrients Suspended Particulate Matter
Cederick T. Henderson	US-P-72 Sampler Operator
Allan Y. Ota	Alkalinity Suspended Particulate Matter Sample processing
Dana D. Harmon	Data reduction
Brian Swarthout	Sample processing
Laurence E. Schemel	Chief Scientist Specific conductance Alkalinity

TABLE B
ABBREVIATIONS TABLE

Column Title	Definition	Units
DAY OF YEAR	Julian Date	
TIME	Standard Time	Hours and Minutes
SPEC CONDUT	Specific Conductance	uS cm^{-1}
ALKALIN	Alkalinity	meq L^{-1}
NO2	Nitrite	uM [1/]
NO3+NO2	Nitrate + Nitrite	uM
NH3	Ammonium	uM
PO4	Ortho-Phosphate	uM
SIO2	Silica	uM
SUS PAR MATTER	Suspended Particulate Matter	mg L^{-1}

[1/] uM = micromolar = umoles L^{-1}. For these nutrients, uM (N,P,Si) = ug-at (N,P,Si) L^{-1} = microgram-atom per liter.

TABLE C

CONVERSION FACTORS

	From	To	Factor
Nitrite	uM[1/]	mg L^{-1}(N)	0.0140
Nitrate + nitrite	uM	mg L^{-1}(N)	0.0140
Ammonium	uM	mg L^{-1}(N)	0.0140
Ortho-phosphate	uM	mg L^{-1}(P)	0.0310
Dissolved silica	uM	mg L^{-1}(Si)	0.0281
Alkalinity	meq L^{-1}	mg L^{-1}($CaCO_3$)	100.

[1/] uM = micromolar = umoles L^{-1}. For these nutrients, uM (N,P,Si) = ug-at (N,P,Si) L^{-1} = microgram-atom per liter.

U S GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 NOV 83	84001	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
305	810	164.0	1.026	0.38	13.09	7.01	1.86	248	11.2
306	745	159.0	1.019	0.33	13.39	8.08	2.09	249	18.4
307	745	157.0	-	0.36	12.63	7.48	1.99	254	12.2
308	748	158.0	1.026	0.36	12.14	6.24	1.77	245	19.6
309	750	159.0	1.019	0.36	12.47	5.84	1.77	252	20.1
310	740	158.0	1.012	0.34	12.56	6.04	1.76	250	17.9
311	744	158.0	1.015	0.25	12.44	6.91	1.79	249	9.9
312	755	157.0	0.949	0.32	14.14	7.19	1.90	243	12.0
312	1300	165.0	1.050	0.41	13.54	7.60	2.00	253	12.5
313	805	159.0	0.944	0.37	14.89	6.95	1.89	240	13.2
314	745	159.0	0.975	0.35	14.70	7.51	1.96	246	13.2
315	730	165.0	1.054	0.41	13.49	8.07	1.95	253	15.2
316	735	178.0	1.120	0.44	15.34	9.22	2.01	251	14.0
317	740	185.0	1.137	0.44	17.45	4.92	1.76	245	21.6
318	748	194.0	1.127	0.60	34.78	4.56	1.77	239	92.8
318	1300	186.0	1.134	0.55	32.26	4.90	1.71	240	68.0
319	745	222.0	1.300	0.62	35.73	4.98	2.10	230	120.0
320	743	170.0	1.026	-	28.47	-	-	240	74.5
321	748	166.0	0.958	0.49	25.91	5.58	1.82	240	79.5
322	755	174.0	0.994	0.49	24.79	5.43	1.94	225	79.5
323	740	143.0	0.829	0.46	21.47	4.82	1.67	220	102.0
324	740	114.0	0.684	0.22	13.51	5.05	1.24	206	118.0
325	735	110.0	0.657	0.21	11.21	4.37	1.26	215	84.0
325	1200	146.0	0.833	0.49	16.77	3.81	1.19	220	98.0
326	730	110.0	0.671	0.18	11.93	3.71	1.09	219	120.7
327	735	141.0	0.834	0.28	15.10	4.22	1.40	229	43.3
328	800	201.0	1.184	0.42	20.47	4.45	1.85	253	56.0
329	805	201.0	1.211	0.60	26.36	5.84	2.29	263	54.0
332	1300	123.0	0.784	0.25	11.20	4.06	0.91	223	106.7

- DATA NOT AVAILABLE

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ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 DEC 83	84031	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
335	745	167.0	1.055	0.23	14.47	1.95	1.15	249	66.7
336	744	171.0	1.123	0.23	15.64	2.88	1.21	259	62.0
337	750	156.0	1.035	0.17	12.83	1.94	1.08	267	44.0
338	742	169.0	1.108	0.23	13.98	3.47	1.19	262	62.7
339	750	135.0	0.902	0.23	13.25	2.79	1.13	262	72.0
339	1200	152.0	0.993	0.30	16.95	-	1.18	255	58.7
340	730	135.0	0.903	0.22	12.96	2.85	1.21	268	62.7
341	725	133.0	0.881	0.21	12.01	1.98	1.07	253	146.7
342	720	170.0	1.103	0.30	17.47	3.30	1.37	237	54.0
343	725	203.0	1.285	0.28	18.50	3.47	1.39	236	50.7
344	715	200.0	1.273	0.30	19.31	3.11	1.41	243	44.0
345	705	174.0	1.054	0.32	18.82	3.73	1.45	238	70.7
346	710	171.0	1.076	0.38	20.64	3.82	1.61	236	110.7
346	1100	144.0	0.934	0.27	13.99	1.86	0.95	227	63.3
347	700	204.0	1.253	0.30	21.96	2.03	1.15	233	219.3
348	700	170.0	1.102	0.24	15.47	2.08	1.37	244	304.7
349	703	154.0	1.008	0.22	13.58	1.93	1.21	250	299.3
350	710	145.0	0.964	0.22	12.92	1.79	1.19	243	239.3
351	710	163.0	1.104	0.25	13.64	1.63	1.09	258	177.3
352	715	172.0	1.173	0.18	13.17	2.42	1.21	267	118.0
353	719	156.0	1.071	0.16	12.40	2.43	1.15	275	86.7
353	1100	177.0	1.207	0.21	13.96	2.49	1.04	271	80.0
354	705	182.0	1.226	0.23	15.18	2.31	1.17	271	70.0
355	720	141.0	0.974	0.15	11.22	2.15	1.13	276	46.0
356	710	142.0	0.975	0.21	10.65	2.05	0.94	280	36.0
357	700	197.0	1.335	0.22	14.50	1.97	1.03	285	49.3
358	710	149.0	1.014	0.27	13.31	1.94	1.08	282	38.0
359	750	166.0	1.127	0.13	13.44	1.83	0.94	277	39.3
360	700	150.0	0.928	0.25	22.43	3.95	1.76	225	70.0
361	740	160.0	1.036	0.27	22.43	2.74	1.59	224	381.3
361	1100	153.0	1.025	0.26	19.28	2.23	1.34	232	386.7
362	740	143.0	0.971	0.27	17.54	2.47	1.31	218	415.3
363	750	131.0	0.893	0.44	13.72	2.39	1.32	211	306.0
364	725	127.0	0.868	0.20	13.51	1.70	1.12	215	283.3
365	718	134.0	0.903	0.24	13.32	1.69	1.28	221	174.7

- DATA NOT AVAILABLE

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ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 JAN 84	84062	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
1	715	145.0	0.997	0.26	14.60	1.61	1.08	234	171.3
2	722	153.0	1.070	0.24	15.36	2.05	1.15	242	134.7
3	730	151.0	1.063	0.35	17.15	3.11	1.40	247	104.0
3	955	160.0	1.126	0.27	16.16	1.73	0.93	241	101.3
4	723	155.0	1.076	0.40	17.06	1.62	1.13	253	90.0
5	720	159.0	1.090	0.25	15.72	2.17	1.05	244	57.5
6	715	150.0	0.990	0.33	17.66	2.49	1.19	249	48.0
7	720	140.0	0.954	0.24	14.86	2.30	1.07	249	41.0
8	715	156.0	1.061	0.31	17.89	2.76	1.21	249	38.0
9	715	158.0	1.085	0.35	20.68	1.93	1.16	253	39.5
10	705	166.0	1.155	0.39	21.29	2.05	1.18	258	41.0
10	930	136.0	0.953	0.24	15.09	2.23	1.01	270	41.5
11	707	192.0	1.314	0.44	22.10	2.39	1.18	259	37.5
12	703	186.0	1.296	0.29	22.02	2.33	1.38	255	50.7
13	719	177.0	1.208	0.37	20.61	1.94	1.08	263	44.7
14	707	220.0	1.479	0.44	23.67	2.70	1.09	248	56.0
15	708	245.0	1.612	0.50	24.95	3.07	1.24	249	50.7
16	704	180.0	1.250	-	17.83	-	-	269	38.7
17	710	170.0	1.183	0.30	17.49	2.61	1.19	272	38.7
17	1145	223.0	1.490	0.37	23.21	3.12	1.11	253	48.5
18	715	169.0	1.167	0.25	16.73	3.03	1.36	275	46.0
19	715	149.0	1.052	0.27	16.31	1.84	1.07	277	54.5
20	735	184.0	1.272	0.29	18.11	2.22	1.11	265	46.5
21	740	197.0	1.319	0.49	25.35	2.75	1.21	248	34.5
22	740	256.0	1.681	0.45	26.29	3.01	1.31	249	37.5
23	743	279.0	1.840	0.48	27.51	4.15	1.21	248	42.0
24	744	275.0	1.806	0.50	26.76	3.79	1.27	249	40.5
24	1130	181.0	1.263	0.38	19.86	4.14	1.30	267	37.3
25	725	269.0	1.782	0.50	26.07	3.56	1.34	247	43.0
26	735	293.0	1.927	0.44	26.95	3.32	1.45	243	45.0
27	735	225.0	1.513	0.35	21.94	2.82	1.01	256	47.0
28	735	207.0	1.386	0.35	20.68	3.55	1.15	257	69.5
29	720	210.0	1.421	0.36	20.35	3.77	1.07	256	50.0
30	735	218.0	1.476	0.33	20.94	4.50	1.29	254	46.5
31	740	220.0	1.443	0.35	20.67	5.08	1.37	257	42.5
31	1200	216.0	1.417	0.36	20.52	4.83	1.26	257	38.0

- DATA NOT AVAILABLE

U S GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 FEB 84	84093	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
32	708	182.0	1.248	0.36	18.61	5.20	1.31	266	34.4
33	730	240.0	1.550	0.41	22.79	5.72	1.43	256	28.8
34	735	251.0	1.602	0.36	23.49	5.80	1.41	260	33.6
35	720	196.0	1.310	0.34	19.84	6.07	1.37	266	28.8
36	740	242.0	1.541	0.36	22.15	5.54	1.45	263	30.0
37	745	202.0	1.337	0.34	19.25	5.94	1.42	268	21.2
38	750	207.0	1.373	0.30	19.74	6.09	1.38	272	17.6
38	1200	250.0	1.597	0.39	23.46	6.14	1.52	267	26.8
39	745	202.0	1.326	0.40	20.26	6.51	1.53	274	18.9
40	730	202.0	1.334	0.30	19.87	-	1.51	273	16.0
41	736	220.0	1.415	0.34	21.54	-	1.32	272	16.0
42	725	231.0	1.483	0.37	23.09	7.73	1.73	273	12.8
43	730	246.0	1.542	0.35	24.61	7.25	1.61	271	14.0
44	735	242.0	1.523	0.39	24.65	7.62	1.61	270	16.0
45	738	229.0	1.465	0.37	22.98	8.04	1.67	277	22.5
45	1200	214.0	1.386	0.40	21.26	8.56	1.65	280	17.0
46	745	248.0	1.546	0.42	23.47	8.30	1.99	268	26.0
47	723	179.0	1.135	0.25	16.83	3.67	1.12	250	48.4
48	747	193.0	1.215	0.27	19.59	3.73	1.16	249	39.2
49	758	143.0	0.928	0.17	13.90	3.22	0.85	247	36.0
50	800	184.0	1.278	0.29	17.18	3.53	1.01	239	52.0
51	745	236.0	1.461	0.35	19.58	3.24	1.14	240	28.4
52	1200	183.0	1.154	0.25	13.64	3.55	1.04	234	30.0
52	1200	211.0	1.338	0.38	16.09	3.24	0.98	234	42.1
53	744	198.0	1.248	0.31	15.62	4.91	1.32	239	27.2
54	735	183.0	1.180	0.28	15.39	4.42	1.11	241	18.8
55	743	158.0	1.026	0.14	13.30	3.19	0.96	237	17.6
56	733	170.0	1.119	0.20	13.58	3.64	0.99	241	18.0
57	746	175.0	1.130	0.19	12.90	4.24	1.02	242	16.8
58	747	190.0	1.226	0.23	13.86	3.66	1.10	243	21.6
59	742	187.0	1.214	0.26	14.23	4.60	1.18	242	21.6
59	1200	186.0	1.210	0.22	14.13	4.61	1.20	246	16.8
60	748	194.0	1.265	0.27	14.52	4.54	1.27	248	20.4

- DATA NOT AVAILABLE

U S GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 MAR 84	84122	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
61	743	193.0	1.250	0.24	14.94	3.07	1.33	250	18.8
62	720	180.0	1.173	0.25	13.10	4.16	1.02	252	21.6
63	729	194.0	1.253	0.31	15.86	4.02	1.22	248	18.0
64	720	228.0	1.428	0.31	17.05	5.32	1.35	247	-
65	719	214.0	1.341	0.33	15.96	4.97	1.26	248	15.2
66	725	202.0	1.287	0.32	14.36	5.59	1.26	253	15.6
66	1200	217.0	1.387	0.31	15.84	5.47	1.36	254	24.8
67	718	196.0	1.267	0.26	14.28	6.20	1.37	258	14.4
68	705	203.0	1.302	0.38	15.35	6.72	1.56	264	14.4
69	740	-	-	0.30	14.51	6.40	1.34	268	12.4
70	716	197.0	1.281	0.30	14.33	5.80	1.35	268	15.6
71	705	186.0	1.228	0.24	13.19	6.00	1.24	270	11.2
72	731	194.0	1.275	0.29	13.78	5.26	1.35	271	12.0
73	725	215.0	1.389	0.30	15.21	5.86	1.57	269	18.0
74	733	205.0	1.341	0.27	14.30	7.07	1.72	269	19.6
74	1200	201.0	1.305	0.31	14.09	7.99	1.96	273	17.7
75	736	217.0	1.392	0.30	15.88	8.62	2.01	267	24.4
76	745	204.0	1.323	0.35	16.60	6.09	1.59	264	28.4
77	749	201.0	1.298	0.31	16.59	6.12	1.66	261	33.6
78	710	172.0	1.148	0.31	14.19	4.65	1.32	270	36.0
79	738	154.0	1.006	0.24	11.71	5.10	1.16	258	51.2
80	730	180.0	1.145	0.31	13.72	4.93	1.32	260	39.2
81	742	173.0	1.131	0.28	12.85	5.56	1.32	271	25.6
82	734	188.0	1.245	0.29	13.29	4.33	1.42	270	29.2
82	1200	175.0	1.163	0.33	11.42	3.27	1.19	269	48.6
83	738	177.0	1.198	0.36	11.60	3.89	1.34	271	17.6
84	732	161.0	1.109	0.21	9.41	3.40	1.13	272	15.2
85	725	167.0	1.138	0.25	9.68	3.30	1.18	273	19.2
86	735	165.0	1.138	0.29	9.43	3.70	1.21	274	18.0
87	720	169.0	1.161	0.36	9.96	4.37	1.33	274	26.4
88	715	176.0	1.191	0.34	10.90	3.54	1.31	275	22.8
89	718	180.0	1.223	0.34	10.98	3.10	1.27	276	23.6
89	1200	175.0	1.192	0.27	-	3.42	1.29	-	22.5
90	717	191.0	1.295	0.29	11.83	2.35	1.24	274	33.2
91	715	170.0	1.173	0.21	10.52	3.38	1.39	275	25.6

- DATA NOT AVAILABLE

U S GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 APR 84	84153	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
92	750	173.0	1.166	0.23	12.03	5.19	1.85	275	16.4
93	703	167.0	1.125	0.22	11.45	3.84	1.57	273	15.2
94	710	150.0	1.038	0.16	10.30	5.12	1.56	280	22.4
95	713	175.0	1.156	0.22	12.66	5.37	1.82	273	24.4
96	715	173.0	1.150	0.23	12.57	4.67	1.80	273	16.0
96	1100	168.0	1.113	0.24	-	5.28	1.46	-	30.2
97	718	176.0	1.159	0.25	13.52	5.20	1.70	271	13.2
98	710	184.0	1.201	0.26	15.07	5.57	1.71	271	12.4
99	710	186.0	1.219	0.32	16.01	5.88	1.85	272	13.6
100	714	183.0	1.217	0.32	16.94	6.54	1.70	275	16.4
101	720	195.0	1.292	0.34	18.88	7.33	1.98	274	16.8
102	715	199.0	1.290	0.34	19.18	8.32	2.12	276	22.4
103	720	193.0	1.263	0.31	19.55	7.69	2.13	274	23.2
103	1015	194.0	1.267	0.32	19.51	7.43	2.11	275	23.4
104	745	194.0	1.265	0.38	20.05	7.52	2.07	275	28.8
105	738	191.0	1.228	0.34	17.89	7.80	1.86	273	25.6
106	715	182.0	1.194	0.32	17.07	7.76	1.97	274	27.6
107	705	180.0	1.191	0.34	16.13	6.98	1.82	263	31.6
108	743	181.0	1.199	0.33	16.59	7.06	1.99	274	27.6
109	740	180.0	1.194	0.36	15.36	7.66	1.99	279	25.2
110	730	178.0	1.155	0.34	17.39	7.13	1.95	271	17.2
110	1045	184.0	1.205	0.35	17.50	8.55	2.22	278	32.2
111	735	185.0	1.237	0.38	17.81	8.09	2.16	273	18.8
112	733	180.0	1.162	0.35	17.69	7.38	1.97	269	16.8
113	735	189.0	1.206	0.41	18.69	8.63	2.13	269	14.8
114	740	197.0	1.306	0.51	19.95	8.29	1.96	270	23.2
115	737	204.0	1.363	0.50	21.34	8.28	1.97	270	18.0
116	730	216.0	1.416	0.52	23.01	9.57	2.40	271	18.0
116	1030	205.0	1.357	0.48	21.66	8.85	2.25	277	18.7
117	715	211.0	1.363	0.49	22.49	10.36	2.50	278	20.4
118	715	205.0	1.327	0.49	21.64	9.81	2.73	278	22.8
119	710	207.0	1.337	0.52	22.41	9.22	2.69	274	24.8
120	711	209.0	1.353	0.56	22.93	8.67	2.66	272	30.8
121	708	212.0	1.345	0.58	23.41	8.18	2.50	271	32.8

- DATA NOT AVAILABLE

U S GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 MAY 84	84183	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
122	705	206.0	1.333	0.60	23.65	8.03	2.50	270	34.0
123	705	205.0	1.334	0.55	23.22	6.54	2.46	265	22.8
124	705	207.0	1.339	0.59	23.53	7.21	2.64	267	18.8
124	945	209.0	-	0.62	23.37	11.74	2.96	273	23.2
125	710	207.0	1.341	0.59	22.93	8.14	2.52	265	18.4
126	703	207.0	1.341	0.66	23.36	9.82	2.95	270	18.4
127	714	195.0	1.269	0.55	20.30	8.94	2.62	270	14.8
128	715	191.0	1.370	0.58	18.20	8.33	2.36	272	15.6
129	720	192.0	1.255	0.54	17.17	9.24	2.51	270	13.2
130	725	180.0	1.193	0.46	15.32	9.21	2.45	264	16.0
131	710	174.0	1.151	0.42	14.11	9.40	2.49	260	26.5
131	915	170.0	1.135	0.44	14.22	9.00	2.56	257	16.0
132	730	165.0	1.100	0.40	12.81	9.10	2.34	253	21.6
133	740	162.0	1.078	0.36	12.53	7.65	1.95	250	21.2
134	743	166.0	1.083	0.36	12.69	6.65	1.99	249	34.4
135	742	163.0	1.079	0.39	12.78	5.61	2.01	248	28.4
136	743	161.0	1.082	0.33	11.54	5.76	1.96	249	31.2
137	747	167.0	1.127	0.35	11.27	6.82	2.06	250	26.4
138	738	172.0	1.137	0.39	12.19	6.56	2.26	250	18.8
138	1100	173.0	1.159	0.37	11.55	8.89	2.56	258	30.8
139	735	177.0	1.152	0.37	12.65	6.80	2.28	249	17.6
140	740	177.0	1.175	0.41	13.32	6.24	2.23	251	17.6
141	748	180.0	1.184	0.41	13.83	6.07	2.36	256	14.8
142	740	183.0	1.246	0.43	13.93	7.41	2.42	261	16.8
143	735	188.0	1.275	0.47	13.69	6.44	2.28	266	15.2
144	748	187.0	1.281	0.41	13.72	7.83	2.20	266	15.6
144	1100	188.0	1.280	0.47	13.99	7.55	2.32	269	15.0
145	720	191.0	1.300	0.41	14.24	8.74	2.44	267	18.8
146	729	193.0	1.301	0.45	14.27	7.79	2.47	267	18.4
147	735	192.0	1.293	0.38	14.00	7.09	2.19	268	20.0
148	748	191.0	1.290	0.38	14.00	5.68	2.07	263	25.2
149	720	192.0	1.294	0.36	14.27	4.90	2.02	267	24.8
150	730	192.0	1.299	0.36	14.49	4.26	1.98	266	26.0
151	745	192.0	1.278	0.36	14.55	4.84	2.09	265	26.4
151	1100	186.0	1.252	0.38	13.94	5.98	2.11	264	26.2
152	715	191.0	1.240	0.32	15.13	4.06	2.30	257	28.0

- DATA NOT AVAILABLE

U S GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 JUN 84	84214	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
153	720	187.0	1.226	0.32	14.80	4.15	2.23	258	22.8
154	730	186.0	1.219	0.34	15.08	3.89	2.26	255	26.8
155	720	187.0	1.206	0.34	14.99	3.35	2.29	253	18.0
156	720	186.0	1.200	0.34	14.47	2.24	2.17	252	15.6
157	720	175.0	1.148	0.36	13.41	3.46	2.20	255	16.4
158	720	171.0	1.122	0.38	13.23	4.60	2.13	252	19.6
158	1150	171.0	1.146	0.37	13.38	4.68	2.10	251	21.6
159	720	168.0	1.118	0.46	13.56	6.53	2.50	253	20.0
160	740	174.0	1.158	0.62	15.18	7.50	2.61	253	24.8
161	740	170.0	1.125	0.62	15.36	7.00	2.55	254	28.4
162	740	167.0	1.120	0.54	14.54	5.81	2.27	254	28.4
163	750	173.0	1.154	0.60	15.61	5.62	2.33	256	33.2
164	740	176.0	1.174	0.60	15.61	4.98	:.14	256	32.0
165	740	176.0	1.184	0.58	15.70	5.17	2.30	257	39.2
165	1120	180.0	1.212	0.56	14.82	5.01	2.15	254	334.6
166	720	181.0	1.187	0.55	13.82	4.18	2.12	238	33.6
167	730	187.0	1.176	0.51	12.66	2.77	2.03	230	28.4
168	740	183.0	1.188	0.53	13.52	2.03	2.06	234	22.8
169	710	183.0	1.176	0.51	13.70	2.28	2.17	236	19.2
170	720	181.0	1.167	0.53	13.70	2.99	2.29	240	17.6
171	740	169.0	1.140	0.53	13.98	3.92	2.32	250	16.0
172	720	159.0	1.094	0.55	12.85	5.32	2.31	244	16.4
172	1120	159.0	1.087	0.53	13.22	4.66	2.27	248	18.2
173	730	159.0	1.066	0.87	13.84	4.67	2.25	250	17.2
174	730	157.0	1.062	0.92	13.91	4.87	2.27	248	21.2
175	720	154.0	1.051	0.67	12.62	4.43	2.18	250	20.8
176	720	154.0	1.053	0.63	12.58	4.55	2.24	249	24.4
177	760	154.0	1.050	0.62	11.84	3.91	2.08	250	20.8
178	740	155.0	1.048	0.65	12.26	3.88	2.13	250	18.0
179	720	154.0	1.047	0.62	12.00	4.03	2.05	251	23.2
179	1120	152.0	1.054	0.63	12.38	4.83	1.98	249	24.8

- DATA NOT AVAILABLE

U S GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 JUL 84	84244	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
187	1130	140.0	0.993	0.55	10.40	5.56	2.02	256	26.8
188	750	140.0	1.009	0.90	10.85	5.59	2.06	258	19.6
189	750	137.0	0.999	0.56	9.68	5.28	1.88	256	21.2
190	760	137.0	0.993	0.59	7.88	5.27	1.89	256	17.6
191	740	135.0	0.989	0.43	9.14	5.68	1.94	258	22.0
192	730	135.0	0.989	0.39	9.37	5.58	1.90	256	23.2
193	740	135.0	0.993	0.38	9.42	6.24	1.89	255	28.0
193	1100	139.0	1.010	0.46	9.93	6.17	1.99	254	25.8
194	740	135.0	0.963	0.50	10.21	4.22	1.93	255	30.4
195	740	136.0	0.971	0.41	9.95	4.68	1.83	255	28.0
196	750	137.0	0.978	0.36	9.97	4.37	1.79	255	23.2
197	740	138.0	0.981	0.30	9.47	3.41	1.78	256	16.0
198	740	136.0	0.984	0.29	9.11	4.76	1.81	258	2.4
199	740	140.0	0.991	0.32	9.10	3.97	1.61	257	12.0
200	730	136.0	0.990	0.29	8.93	5.45	1.81	258	11.6
200	1120	137.0	1.003	0.30	8.44	5.76	1.85	257	19.8
201	740	136.0	0.983	0.32	8.65	4.38	1.76	258	13.2
202	750	135.0	0.984	0.26	8.11	4.46	1.70	258	11.2
203	720	136.0	0.994	0.25	7.63	4.82	1.72	257	12.8
204	720	135.0	0.993	0.26	7.50	5.49	1.81	257	20.4
205	720	136.0	0.992	0.27	7.77	5.08	1.65	257	22.8
206	710	134.0	0.992	0.26	7.57	4.72	1.58	256	22.4
207	720	133.0	0.986	0.25	7.40	5.26	1.59	254	26.0
207	1120	137.0	1.012	0.30	8.02	5.58	1.06	248	30.0
208	720	133.0	0.997	0.26	7.78	5.98	1.88	255	23.6
209	750	134.0	1.018	0.21	7.58	4.19	1.82	256	26.0
210	720	136.0	1.019	0.20	7.48	3.68	1.64	257	29.6
211	720	138.0	1.039	0.19	7.62	4.71	1.74	256	32.8
212	720	152.0	1.034	0.24	8.01	3.47	1.77	254	20.0
213	710	160.0	1.042	0.23	8.06	2.65	1.61	252	13.6

- DATA NOT AVAILABLE

U S GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 AUG 84	84275	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
214	725	141.0	1.060	0.24	7.68	3.89	1.54	256	16.8
214	1130	143.0	1.081	0.20	7.05	4.90	1.78	259	28.2
215	740	143.0	1.075	0.41	7.57	4.30	1.78	259	21.2
216	750	144.0	1.099	0.32	7.19	3.74	1.65	260	18.0
217	750	144.0	1.104	0.33	7.00	4.20	1.68	259	18.4
218	755	150.0	1.121	0.38	7.39	4.69	1.88	261	20.0
219	735	149.0	1.119	0.33	6.97	4.49	1.80	262	20.0
220	730	150.0	1.127	0.32	7.43	4.42	1.85	263	24.0
221	740	150.0	1.132	0.29	7.17	5.08	1.99	266	22.8
221	1045	154.0	1.141	0.28	7.81	5.59	2.12	264	20.0
222	740	153.0	1.146	0.28	7.44	3.94	1.83	265	24.8
223	740	154.0	1.165	0.21	7.03	3.74	1.85	269	26.4
224	740	157.0	1.191	0.22	7.14	3.03	1.79	271	24.8
225	750	158.0	1.198	0.23	6.73	3.72	1.94	273	24.8
226	740	158.0	1.187	0.26	7.18	3.06	1.90	273	18.4
227	745	161.0	1.202	0.21	7.17	2.91	1.80	272	15.2
228	725	164.0	1.209	0.20	7.25	2.75	1.83	267	14.0
228	1130	160.0	1.206	-	-	-	-	-	-
229	0	160.0	1.206	-	-	-	-	-	-
230	0	164.0	1.237	-	-	-	-	-	-
231	0	164.0	1.233	-	-	-	-	-	-
232	0	165.0	1.249	-	-	-	-	-	-
233	0	168.0	1.255	-	-	-	-	-	-
234	0	168.0	1.258	-	-	-	-	-	-
235	0	167.0	1.265	-	-	-	-	-	-
235	1540	166.0	1.262	0.19	6.41	2.83	1.85	263	12.4
236	720	169.0	1.229	0.26	6.64	4.43	1.99	-	19.6
237	725	171.0	1.295	0.29	6.57	3.09	2.03	264	22.8
238	723	173.0	1.317	0.25	6.78	4.07	2.03	264	26.0
239	724	174.0	1.327	0.26	7.20	4.05	2.12	267	29.2
240	720	175.0	1.340	0.29	7.37	3.49	2.10	268	26.8
241	730	180.0	1.331	0.28	7.45	3.26	2.06	267	21.2
242	750	191.0	1.322	0.27	7.41	3.70	2.06	265	8.0
242	1200	178.0	1.348	0.26	7.46	6.26	2.25	271	30.4
243	735	178.0	1.352	0.42	8.05	5.81	2.63	273	18.4
244	745	179.0	1.350	0.40	7.79	5.03	2.28	274	17.2

- DATA NOT AVAILABLE

U S GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 SEP 84	84306	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
245	740	180.0	1.331	0.50	7.84	4.17	2.22	267	24.0
246	743	183.0	1.353	0.41	8.31	4.77	2.11	265	15.2
247	740	188.0	1.325	0.47	9.52	5.05	2.09	266	19.2
248	750	191.0	1.383	0.45	9.71	5.74	1.91	268	19.2
249	740	191.0	1.393	0.36	9.65	6.50	2.00	269	21.2
249	945	195.0	1.409	0.39	10.10	7.13	2.54	278	20.0
250	735	194.0	1.424	0.49	9.25	7.37	2.26	266	24.8
251	725	194.0	1.414	0.51	10.11	5.47	2.21	275	22.4
252	733	192.0	1.396	0.49	10.03	7.06	2.06	272	20.4
253	733	194.0	1.399	0.48	10.13	5.27	2.11	274	21.6
254	740	194.0	1.407	0.44	9.09	5.65	1.95	259	26.8
255	743	193.0	1.395	0.52	10.12	5.74	1.88	274	24.0
256	750	187.0	1.344	0.40	9.10	6.79	2.02	268	19.6
256	1945	190.0	1.337	0.43	8.95	6.63	2.20	264	11.0
257	735	184.0	1.389	0.61	9.52	7.63	2.19	263	12.4
258	748	182.0	1.342	0.64	9.70	6.55	2.24	263	11.6
259	746	175.0	1.296	0.55	9.23	7.98	2.11	264	10.0
260	740	167.0	1.236	0.53	8.84	6.09	1.81	257	11.2
261	735	169.0	1.232	0.56	9.32	6.71	2.04	255	13.2
262	726	169.0	1.218	0.58	9.36	5.68	1.87	252	12.0
262	1545	170.0	1.219	-	-	-	-	-	9.4
263	725	166.0	1.210	0.53	9.12	6.79	2.04	250	20.4
264	715	163.0	1.185	0.46	8.56	7.97	2.18	250	24.0
265	710	159.0	1.147	0.39	8.28	7.67	2.11	249	16.4
266	715	152.0	1.120	0.41	8.60	6.57	1.78	247	28.0
267	716	150.0	1.142	0.37	8.71	6.29	1.79	247	22.8
268	725	149.0	1.099	0.37	8.69	5.72	1.77	245	29.2
269	710	149.0	1.124	0.46	9.28	6.80	1.90	244	31.6
269	1015	150.0	1.100	0.42	9.24	8.19	2.03	248	34.0
270	720	152.0	1.099	0.72	10.07	4.61	2.02	245	22.0
271	710	159.0	1.158	0.76	10.63	4.61	2.05	241	19.2
272	725	158.0	1.136	0.70	11.21	6.75	1.95	244	23.2
273	715	151.0	1.111	0.71	10.98	7.31	2.28	252	18.8
274	730	147.0	1.064	0.60	11.57	7.11	2.01	255	18.8

- DATA NOT AVAILABLE

U S GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 OCT 84	84336	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
275	735	149.0	1.085	0.62	11.31	7.14	1.99	258	15.2
276	740	152.0	1.089	0.75	11.43	7.54	2.10	259	16.0
277	735	148.0	1.062	0.71	10.90	8.42	2.25	261	16.4
277	930	147.0	1.067	0.57	10.50	9.38	2.31	261	13.6
278	740	148.0	1.059	0.95	11.17	7.61	2.34	259	16.8
279	735	147.0	1.061	0.70	10.75	7.46	2.46	258	17.2
280	745	147.0	1.073	0.69	10.41	8.17	2.29	259	18.8
281	740	148.0	1.062	0.76	10.80	7.12	2.38	261	19.2
282	737	151.0	1.072	0.79	11.39	7.49	2.37	265	20.8
283	745	151.0	1.085	0.72	11.61	7.64	2.47	268	22.0
284	730	150.0	1.082	0.75	11.74	7.74	2.46	269	17.6
284	1600	150.0	1.077	0.72	12.17	8.10	2.52	268	16.0
285	730	147.0	1.042	0.86	12.18	7.28	2.43	266	19.2
286	730	144.0	1.027	0.73	11.65	8.94	2.56	266	16.4
287	715	144.0	1.028	0.82	12.26	8.22	2.47	268	13.2
288	744	145.0	1.035	0.80	11.47	8.27	2.52	268	18.4
289	730	150.0	1.045	0.76	12.91	8.96	2.69	269	15.2
290	745	153.0	1.081	0.67	12.55	8.57	2.71	273	15.2
291	745	157.0	1.112	0.72	12.80	8.34	2.60	276	12.0
291	1030	156.0	1.095	0.69	13.64	9.47	2.76	272	11.9
292	746	160.0	1.110	0.69	13.43	8.69	2.93	275	14.8
293	750	159.0	1.092	0.60	13.74	10.43	3.06	276	15.2
294	730	156.0	1.094	0.60	14.46	10.43	3.09	275	15.6
295	715	156.0	1.086	0.57	15.77	10.67	3.12	277	18.0
296	720	159.0	1.091	0.57	15.97	9.80	3.19	280	16.0
297	717	159.0	1.089	0.57	15.63	9.67	3.30	283	25.6
298	711	159.0	1.100	0.57	15.70	9.14	3.18	284	23.6
298	1600	160.0	1.084	0.58	15.70	5.84	2.83	254	26.4
299	710	183.0	1.092	0.54	16.21	7.98	2.96	274	14.4
300	745	166.0	1.089	0.56	16.11	6.80	2.86	262	16.8
301	747	168.0	1.081	0.51	16.38	6.73	2.91	267	14.8
302	746	167.0	1.099	0.51	16.07	6.79	2.85	271	14.8
303	745	163.0	1.020	0.53	15.14	8.43	3.28	288	12.4
304	730	164.0	1.103	0.50	14.45	9.49	3.12	288	11.6
305	735	167.0	1.136	0.53	14.73	9.92	3.05	288	12.8
305	1015	165.0	1.120	0.51	15.32	7.95	2.95	268	12.4

- DATA NOT AVAILABLE

U S GEOLOGICAL SURVEY - WATER RESOURCES DIVISION

ESTUARINE RESEARCH GROUP

DATE	FILE NUMBER	LOCATION
1 NOV 84	84367	RIO VISTA BRIDGE

DAY OF YEAR	TIME	SPEC CONDUT US/CM	ALKALIN MEQ/L	NO2 UM	NO3+NO2 UM	NH3 UM	PO4 UM	SIO2 UM	SUS PAR MATER MG/L
306	740	169.0	1.159	0.57	14.83	10.78	3.36	288	12.0
307	737	169.0	1.160	0.54	14.35	10.96	3.34	290	12.8
308	738	169.0	1.169	0.56	14.38	9.50	3.02	291	12.8
309	734	166.0	1.160	0.52	13.48	9.40	2.77	288	11.6
310	744	159.0	1.118	0.49	12.93	9.90	2.80	289	11.6
311	745	162.0	1.133	0.51	13.65	9.12	2.73	288	15.6
312	730	162.0	1.134	0.53	13.96	8.34	2.83	284	13.2
313	720	165.0	1.139	0.42	13.51	9.51	2.90	289	12.8
313	545	167.0	1.129	0.43	14.35	8.71	2.82	284	12.8
314	710	165.0	1.152	0.38	13.05	9.13	2.83	289	12.4
315	720	169.0	1.154	0.37	14.19	8.23	2.66	278	10.4
316	720	174.0	1.122	0.39	14.28	7.83	2.50	273	14.0
317	725	168.0	1.118	-	-	-	-	-	10.8
318	723	163.0	1.121	0.37	14.24	8.32	2.44	288	10.8
319	719	167.0	1.141	0.36	14.17	8.26	2.50	291	9.2
320	750	168.0	1.142	0.38	15.92	7.67	2.54	295	18.4
320	1000	167.0	1.134	0.40	15.55	8.17	2.63	295	17.6
321	748	153.0	1.029	0.28	20.09	5.56	1.65	285	48.8
322	740	165.0	1.089	0.33	22.47	5.71	1.80	268	61.5
323	715	200.0	1.266	0.37	25.50	5.00	2.01	259	61.7
324	735	199.0	1.258	0.48	23.81	5.25	2.19	264	47.5
325	734	182.0	1.196	0.39	20.66	5.43	2.22	283	48.7
325	1015	182.0	1.179	0.33	18.92	5.31	2.02	285	36.0
326	725	181.0	1.179	0.31	18.64	5.24	1.95	284	58.5
327	734	204.0	1.298	0.35	20.91	6.24	2.22	288	51.0
328	715	162.0	1.130	0.26	17.90	4.53	1.79	300	52.5
329	714	202.0	1.291	0.35	20.35	5.46	2.21	300	26.5
330	745	178.0	1.209	0.30	17.41	5.02	1.73	289	48.0
331	735	160.0	1.118	0.25	16.12	7.94	1.93	315	50.0
332	748	227.0	1.396	0.40	21.06	5.27	2.28	295	26.0
333	747	194.0	1.235	0.33	19.53	4.52	2.00	292	54.5
334	750	233.0	1.361	0.42	25.26	6.07	2.64	276	51.0
334	1651	177.0	1.148	0.35	22.00	5.26	2.10	287	59.0

- DATA NOT AVAILABLE