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Gateway National Recreation Area



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DIVISION OF NATURAL RESOURCES



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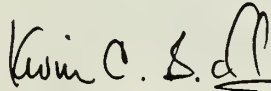
United States Department of the Interior
NATIONAL PARK SERVICE

Gateway National
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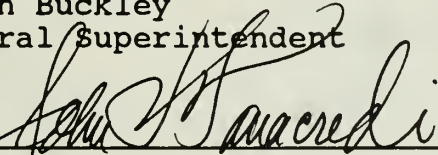
GATEWAY NATIONAL RECREATION AREA
DIVISION OF NATURAL RESOURCES

1995 WATER QUALITY SURVEY REPORT

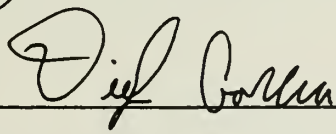
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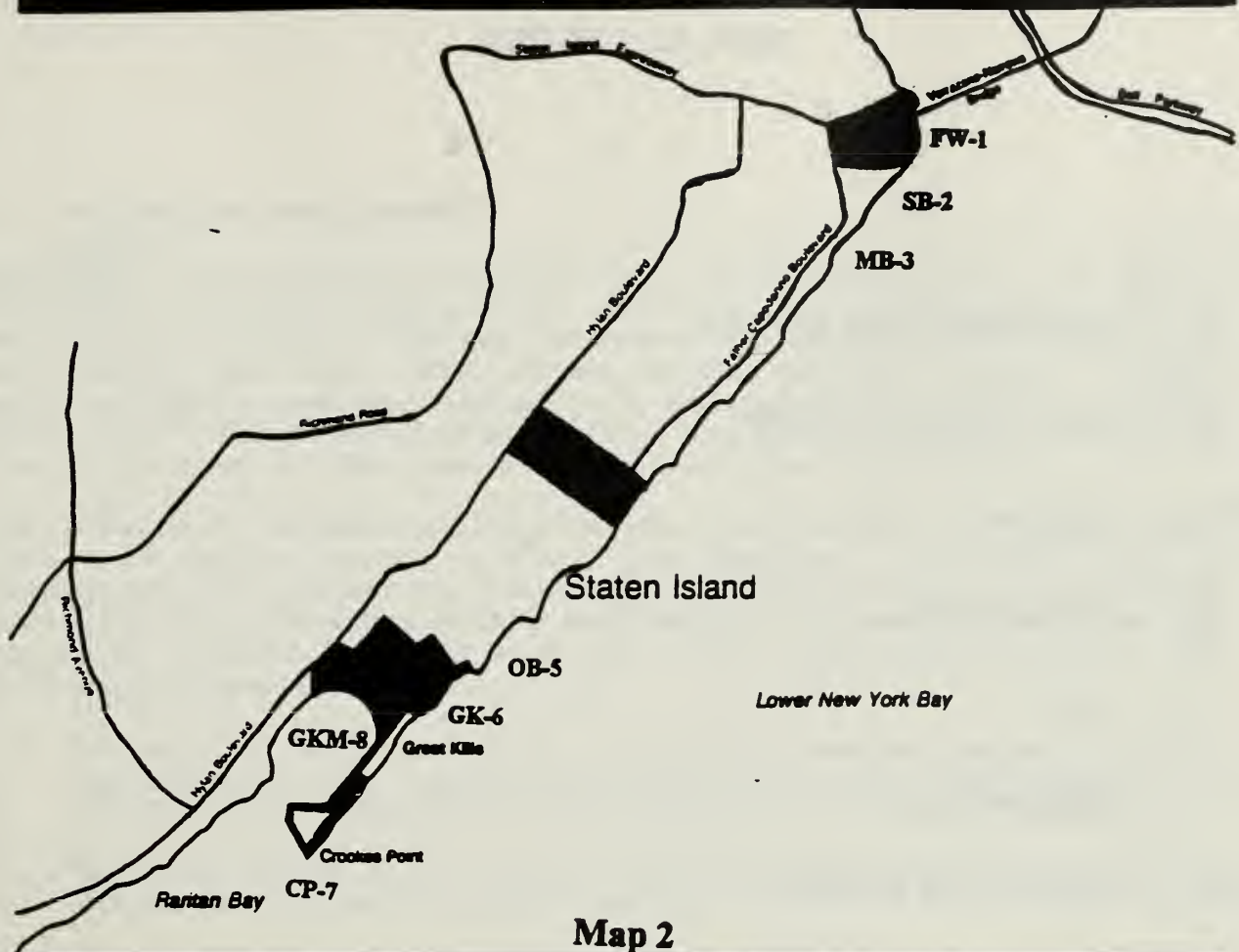
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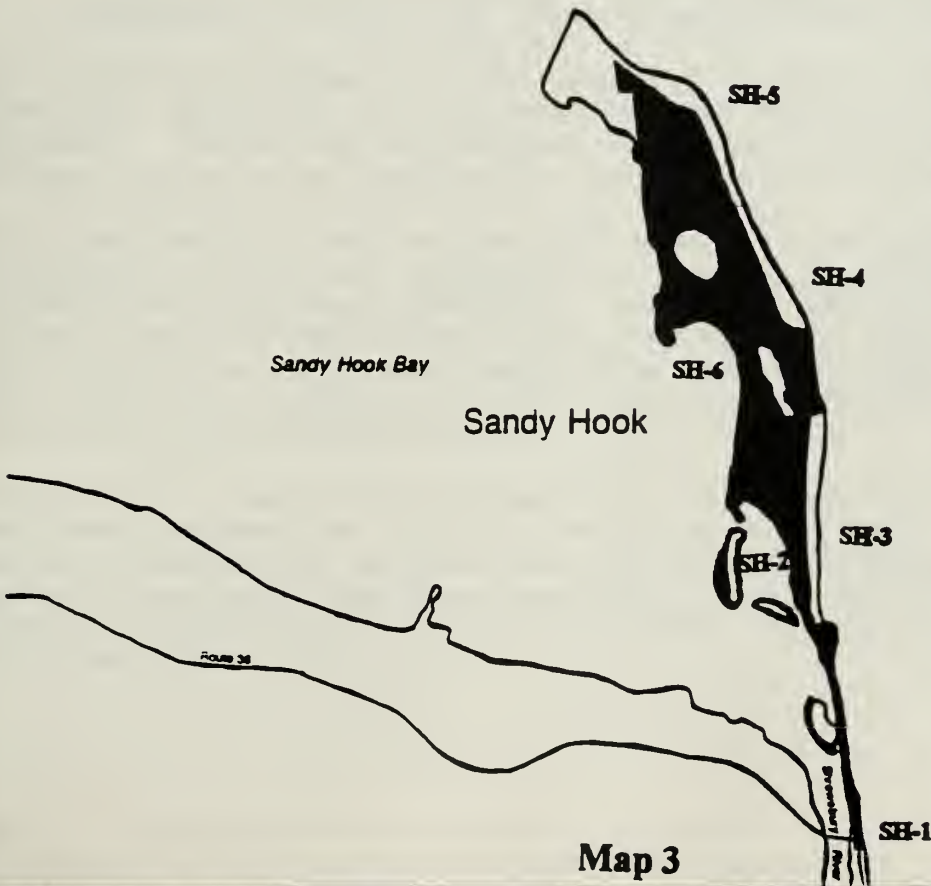




Map 1



Map 2



Map 3

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I. BACKGROUND AND HISTORY

Gateway's Water Quality Program was initiated in 1977 to form a data base for the management of park waters for public health and ecological quality. The marine waters of Gateway NRA are part of the larger New York, New Jersey Harbor estuary system. These waters, which include Jamaica Bay and waters adjacent to Sandy Hook, Great Kills and Breezy Point, are heavily impacted upon by the activities of the huge metropolitan area population.

The loading of various pollutants into park waters can impair many uses such as swimming, fishing and boating. Therefore, it is imperative that different parameters of water quality be measured routinely to ensure the safety and health of humans as well as the ecosystem itself. Water quality data was collected for the following purposes:

1. To monitor bacterial levels at public beaches under Gateway jurisdiction for compliance with city, state and federal public health standards for contact-recreational beaches.
2. To monitor bacterial levels at other sites within the park to determine trends in water quality.
3. To identify potential long-term acceptable beach sites.
4. To provide data for the evaluation and review of Gateway's Natural Resources Management Plan regarding fish and wildlife management as well as visitor public health and safety.

The sampling program has been evolving since its inception in 1976. Identical sample sites and methods have been used from 1981 to the present. Two sites are sampled in Breezy Point, eight in Staten Island and nine in Jamaica Bay from June 5th through Labor Day.

This monitoring program included some of the Park's most heavily impacted sites: the outfalls of sewage treatment plants, the Pennsylvania Avenue Landfill, and JFK International Airport. Surface and bottom monitoring of nine sites in Jamaica Bay included not only total and fecal coliforms but also phosphate, nitrate, chlorophyll a, total and free chlorine, dissolved oxygen, pH, salinity and conductivity.

In 1988, six new sites were added to include the beaches of Gateway National Recreation Area in the Sandy Hook Unit. The beaches of primary concern in the park are those sites that are designated as bathing beaches. They are located at Sandy Hook (SH3, SH4, SH5), Staten Island (Great Kills Beach-GK6), Breezy Point (ATL 1) and Riis Park (ATL 2).

The basis for water quality classification is total and fecal coliform enumeration. Coliforms are a group of specific microorganisms whose densities can be related quantitatively to swimming related health hazards. The concern is with infectious, enteric diseases, such as cholera and typhoid fever, whose etiological agents are excreted in feces and are spread by water and food contaminated with fecal wastes (Cabelli et al., 1983).

Total coliform counts of 2400/100ml and fecal coliform counts of 200/100ml are the respective New York State and New Jersey State bacterial standard limits and have the following advantages:

1. Relative simplicity and accuracy of measurement with the Membrane Filter Method (Approved in Standard Methods).
2. Speed of Results: Counts are available within 24 hours of filtration.
3. Ease of comparison with previous data.
4. Measurement of a broader spectrum of coliform bacteria insures the inclusion of most potential pathogens.

II. WATER QUALITY TRENDS

1. Breezy Point/Sandy Hook

The beaches of Breezy Point, the Rockaways (Riis Park), and Sandy Hook are usually Gateway's cleanest and have been consistently acceptable for bathing over the years tested.

2. Jamaica Bay

The waters of Jamaica Bay are the most heavily impacted bacteriologically in Gateway National Recreation Area. The sewage treatment plants and CSOs emptying into Jamaica Bay combine with its poor flushing action (35 day residence time) to produce consistently high average total and fecal coliform counts in peripheral channels and in areas where circulation is poor such as Bergen Basin. The bay's waters are classified as unacceptable for bathing and continue to express high coliform counts.

3. Staten Island

Water quality at sample sites in Staten Island have been "marginal" in past years, with South Beach (SB2) being officially closed to swimming by the New York City Department of Health. Other sites have seasonal averages below city and federal standards (2400/100ml total coliform) but show occasional unhealthy counts throughout the bathing season.

III. METHODS

SAMPLING AND COLIFORM TESTING

Sampling and Membrane Filter culture methods followed standard EPA procedures for wastewater analysis (Bordner and Winter, eds., 1978) with minor modifications. Gateway's Operations Manual for Bacteriological Analysis of Beach Water using the Membrane Filter Technique (Simon, 1984) provides a detailed description of methods used. Total and fecal coliform measurements were obtained for all sample sites on a weekly basis between June 5th thru Labor Day.

In Jamaica Bay, surface and bottom water samples were collected by boat (Map 1), while Staten Island (Map 2), Breezy Point (Map 1) and Sandy Hook (Map 3) samples were collected by wading into the surf zone. Samples were then stored in ice-filled coolers and transported to Floyd Bennett Field to be picked up by Ecotest Laboratories Inc.

Based on data from previous years for all sites sampled, a standard dilution scheme for each site was developed to optimize the number of countable plates obtained (TABLE I). Data were recorded for sampling time, any unusual water conditions and counts for each dilution were summarized on weekly data sheets.

Standard counts (colonies/100ml) were calculated for each site using the following formula:

$$\text{Count/100ml} = \# \text{ colonies counted/vol filtered} \times 100\text{ml}$$

The densities for each site were calculated to be the arithmetic means of the dilutions that showed 20-200 colonies for that week.

$$\begin{array}{rcccl} & \text{colony} & & \text{colony} & & \text{colony} \\ & & + & & + & \\ \text{Count/100ml} & = & \text{count} & & \text{count} & & \text{count} \\ & & \hline & \text{Vol. 1} & + & \text{Vol. 2} & + & \text{Vol. 3} \end{array} \quad \times 100$$

If no plates were found to have less than 200 colonies for a given site, the smallest volume sampled was used to calculate density. If the plate was completely overgrown and no count could be made, the density was determined by dividing 200 colonies by the smallest volume filtered.

IV. DISCUSSION

1. WATER QUALITY TRENDS

Water quality classification, based on New York State and New Jersey State criteria, has remained the same in all three units.

Breezy Point sites have been classified as acceptable, Jamaica Bay sites as unacceptable and Staten Island sites acceptable (but marginal over short periods) for bathing.

This year's total coliform averages for Jamaica Bay have shown a slight decrease over preceding years (TABLE II), while Breezy Point, Staten Island and Sandy Hook all exhibit the same general trend. Fecal coliforms, considered to be the more reliable indication of the risk of enteric disease, and/or falling over the same period of time in all units of the park.

Another parameter measured during the warm weather season is dissolved oxygen [DO]. Most organisms need oxygen to survive. If oxygen levels are insufficient, then fish and other aquatic life will go elsewhere or die. In Jamaica bay, surface waters are generally sufficiently oxygenated, but some bottom areas have been found to exhibit low DO levels periodically.

Analysis of dissolved oxygen in Jamaica Bay over the period tested, shows sharp declines occurring in mid July thur early August for top and bottom samples. Sites in the northeastern part of the bay fail to meet NYS Standards for dissolved oxygen (6.0 ppm) for most of the summer.

2. FACTORS EFFECTING WATER QUALITY

The quality of the waters surrounding Gateway is determined largely by pollutant inputs such as treated and untreated sewage, CSOs, industrial effluent, ocean dumping of sewage sludge and toxic waste leachates. The concentrations of these pollutants are controlled by chemical, physical, and biological processes in the marine environment (Dyer, 1973).

At any given time water quality will vary depending on a variety of other factors. These include tidal mixing, vertical mixing of the water column by wind and wave, biological oxygen demand (BOD), photosynthesis by phytoplankton and water temperature.

Total and fecal coliforms serve as nonconservative tracers of sewage related pollution (Dyer, 1973). They are nonconservative in the sense that they are rapidly removed from the marine environment by dieaway and incorporated into the sediments and decreases in their concentrations are not solely dependent on their physical transport and diffusion. Dieaway for total coliforms in Jamaica Bay was estimated to be 1.3 days and 1.5 days for fecal coliforms (Cardenas, 1983).

3. WATER QUALITY EMERGENCIES

In the past, Gateway's policy for the protection of public health at bathing beaches has been to officially close beaches by public

notice when individual samples with total coliform values greater than 2400/100ml and fecal coliforms greater than 200/100ml are detected over a three consecutive day period at a given beach. Although this is an effective response to a persistent problem, it does leave a three day period during which bathers are potentially exposed to unhealthy concentrations of coliform organisms. Literature indicates that swimmers stand a much greater risk of contacting disease from polluted water than nonswimmers when swimmers are defined as those who undergo total immersion (Cabelli et al., 1983).

The following procedures are followed when a sample is determined to have greater than 200/100ml fecal coliform and greater than 2400/100ml total coliform count is collected at one of Gateway's beaches:

1. Immediately contact the Water Quality Specialist in the Division of Natural Resources, who will notify the Superintendent of the unit effected by the potential problem and advise to alert lifeguards to look for unusual odors, fecal matter, algae, oil, or grease in water or on the beach and to pull swimmers from the water at their discretion.
2. Check with New York City Health Department to determine if any overflow incident or accidental release of raw sewage has occurred at local sewage treatment plants. Advise the Chief, Division of Resource Management at Gateway, and document all communication with New York City Health Department.
3. Collect 5 samples at different locations (at least 50 yards apart) on the suspect beach and filter volumes of 10, 5 and 3ml for each sample.

Swimmers should be prevented from bathing by lifeguards if any of the following is observed:

1. Elevated average total (greater than 2400/100ml) and fecal coliform (greater than 200/100ml) counts of replicate samples.
2. Presence of oil, grease, or fecal matter in water or on the beach in large quantities.
3. Accidental spillage of raw sewage or of any toxic substance in the waters adjacent to the beach which may adversely effect public health.
4. Any other environmental incident which may be detrimental to the health and safety of the bathers.

Swimmers should be kept out of the water as long as replicate testing continues to show elevated coliform levels or other adverse environmental conditions persist. This will allow continued public

access to the beach while still protecting the public health. If these conditions persist for three days or more, however, the beach should be closed officially by public notice and should remain closed until water quality has returned to normal levels. It is the responsibility of the park's Water Quality Specialist to carefully document water quality and environmental conditions when beach closure is considered. A looseleaf laboratory notebook is to be carefully maintained for each season's data. The notebook should contain all data and summary sheets and be used as a log for all laboratory and field operations.

4. DATA

Coliform data throughout the season at most sites showed high variability. This was probably due to error implicit in the method (Fleisher and McFadden, 1979) and various environmental factors.

TABLE III exhibits the days during which standard water quality values were exceeded.

5. PRECIPITATION

Precipitation values were gathered from data collected at the Floyd Bennett Field weather station. Reading generally cover a period of approximately 40-48 hours prior to time of sampling. Precipitation is a known cause of intermittent decreases in water quality. It produces shock loading of pollutants to local waters by storm waters and combined sewage overflows. (NYC DEP, 1987)

Total and fecal coliform counts have been consistently higher following rainfall in local waters (NYC Department of Health, 1983) (TABLE IV).

6. TIDES

Tidal currents and tidal flushing account for much of the transport and dilution in estuaries (Dyer, 1973). Sampling at Gateway sites is performed irrespective of the tidal state.

7. WATER QUALITY PARAMETERS

Water quality parameters include dissolved oxygen (DO), temperature, pH, salinity, and conductivity. These have been taken at both the surface and bottom of nine sites in Jamaica Bay in the past in order to better assess the physical characteristics of these waters throughout the season. However, this season it was determined to be beneficial to the Park's water quality program to also sample some important nutrients in Jamaica Bay.

The results for all water quality sampling at Gateway National Recreation Area are expressed on TABLES V through XVI.

Note: 1995 Water Quality testing for nutrients, Fecal and Total coliform was not conducted at Gateway National Recreation Area laboratory due to relocation of the Resource Management Division. All analysis of these parameters were performed by:

Ecotest Laboratories, Inc.
377 Sheffield Ave.
N. Babylon, N.Y. 11703
1(516) 422-5777

V. REFERENCES

1. American Public Health Association (1975)
Standard Methods for the Examination of Water and Wastewater. 14th Edition; American Public Health Association, Water Pollution Control Federation 1193 pp.
2. Bordner, R. and J. Winter, Eds. (1978)
Microbiological Methods for Monitoring the Environment: Water and Wastes; EPA-600/8-78-017 Environmental Monitoring and Support Laboratory Office of Research and Development USEPA.
3. Cabelli et al., (1983)
A Marine Recreational Water Quality Criterion Consistent with Indicator Concepts and Risk Analysis, JWPCF 55:10.
4. Cabelli et al., (1979)
Relationship of Microbial Indicators to Health Effects at Marine Bathing Beaches; Amer. Jour. Public Health 69:690-696.
5. Cardenas, Raul R. (1983)
Evaluation of Water Quality Summer Study - 1983 Gateway National Recreation District, National Park Service, Jamaica Bay District, Brooklyn, New York, Contract Number CX 1600-2-0064 Vol. I and II; Polytechnic Institute of New York, Department of Civil and Environmental Engineering.
6. Cunningham, Bob C. (1977)
Contaminants in the Marine Environment Surrounding Gateway National Recreation Area and Their Effects on Recreation, Wildlife and Humans. Gateway National Recreation Area 16pp.
7. Dewling, R.I., Seidenberg and Kingery (1970)
Effect of Seasonal Effluent Chlorination on Coliforms in Jamaica Bay. Journ. WPCF 42:1351.
8. Duedall et al., (1979)
MESA NY Bight Atlan. Monograph, New York Sea Grant Institute Albany, New York 47pp.
9. Dyer, K.R.. (1973)
Estuaries: A Physical Introduction, John Wiley and Sons 133pp.
10. Environmental Studies Board, (1971)
Jamaica Bay and Kennedy Airport - A Multi-disciplinary Environmental Study National Academy of Sciences, National Academy of Engineering 150pp.
11. Fleischer, J.M. and R.M. McFadden, (1979)
Obtaining Precise Estimates in Coliform Enumeration, Water Research 14:477-483.

12. Gateway National Recreation Area, (1982)
Operations Manual for Bacteriological Analysis of Beach Water Using the Membrane Filter Technique, Gateway National Recreation Area, Division of Professional Services 8pp.
13. Lettau, B., Brower and Quayle, (1976)
Marine Climatology. MESA NY Bight Monograph New York Sea Grant Institute Albany, New York 239pp.
14. New York City Department of Health, (1983)
Beach and Harbor Water Quality Sampling Program NYC Dept. of Health.
15. New York City Department of Environmental Protection, Water Quality Section (1987)
New York Harbor Water Quality Survey: 1986. New York City Dept. of Environmental Protection, 154pp.
16. O'Connor, D.J. , Robert, Thomas, and Salas, (1977)
Water Quality, New York Bight Atlas Monograph MESA - NY Bight Atlas Monograph, New York Sea Grant Institute 104pp.
17. Simon, Harvey, (1984)
Revised Operations Manual for Bacteriological Analysis of Beach Water Using the Membrane Filter Technique. National Park Service, Gateway National Recreation Area.
18. Squires, Donald F., (1983)
The Ocean Dumping Quandary: Waste Disposal in the New York Bight, SUNY Press. Albany 65-68 pp.

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Table I

Dilutions (Volumes) By Site For MF Analysis

Sample Site	Volumes To Be Filtered	
	Total Coliform	Fecal Coliform
Staten Island		
FW-1	10, 5, 3	10, 5, 3
SB-2	10, 5, 3	10, 5, 3
MB-3	10, 5, 3	10, 5, 3
NDB-4	10, 5, 3	10, 5, 3
OB-5	10, 5, 3	10, 5, 3
GK-6	10, 5, 3	10, 5, 3
CP-7	10, 5, 3	10, 5, 3
GKM-8	10, 5, 3	10, 5, 3
Breezy Point		
ATL-1	10, 5, 3	10, 5, 3
ATL-2	10, 5, 3	10, 5, 3
Jamaica Bay		
R1-3	10, 5, 3	10, 5, 3
RB	10, 5, 3	10, 5, 3
BC	10, 5, 3	10, 5, 3
JFKS	10, 5, 3	10, 5, 3
JFKN	10, 5, 3	10, 5, 3
JB-9	10, 5, 3	10, 5, 3
BB	10, 5, 3	10, 5, 3
JB-6	10, 5, 3	10, 5, 3
PAL	10, 5, 3	10, 5, 3
Sandy Hook		
SH-1	10, 5, 3	10, 5, 3
SH-2	10, 5, 3	10, 5, 3
SH-3	10, 5, 3	10, 5, 3
SH-4	10, 5, 3	10, 5, 3
SH-5	10, 5, 3	10, 5, 3
SH-6	10, 5, 3	10, 5, 3

Example: Smallest volume filtered = 1ml
 20 colonies X 100 = 2,000/100ml
 1ml
 The density would then be logged as 2,000/100ml.

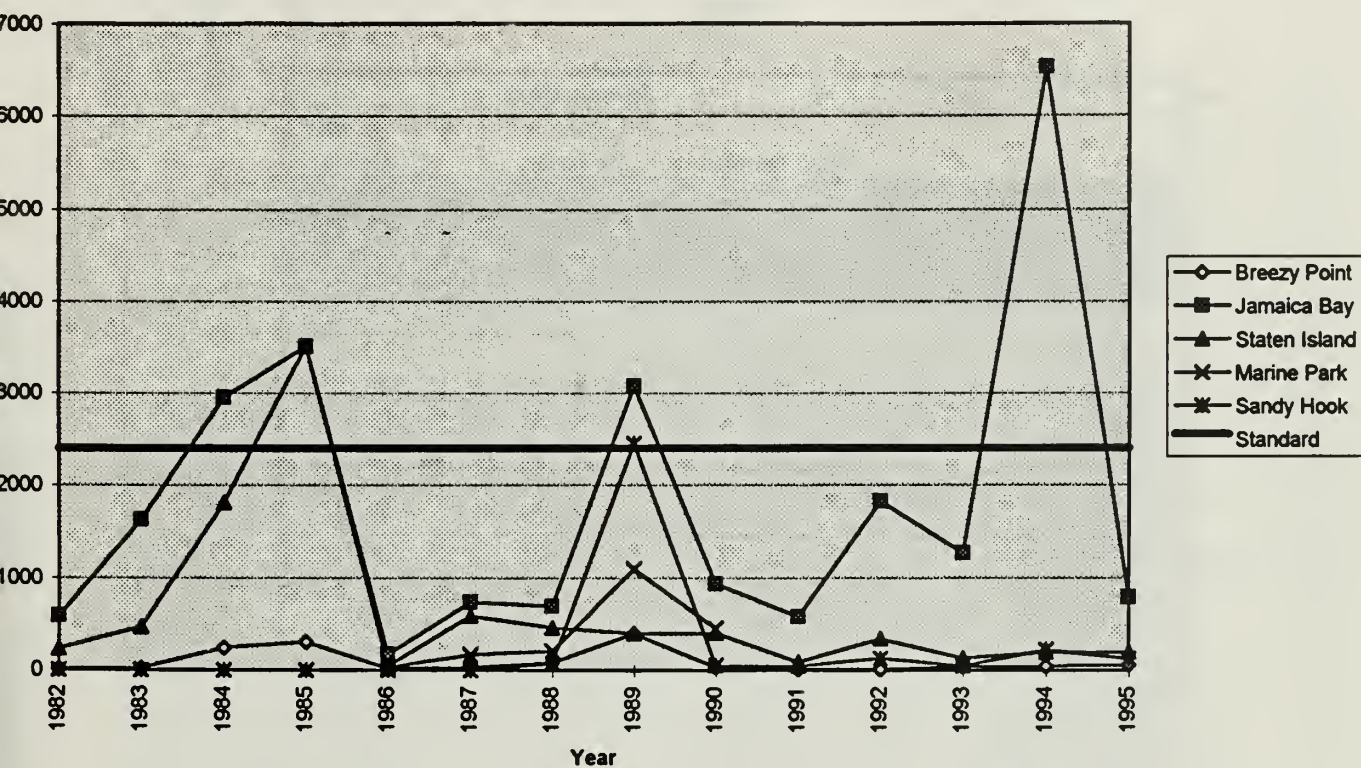
Table II
Gateway Total and Fecal Coliform Seasonal Averages
1982-1995

Year	Breezy Point		Jamaica Bay		Staten Island		Marine Park		Sandy Hook	
	Total	Fecal	Total	Fecal	Total	Fecal	Total	Fecal	Total	Fecal
1982	15	8	588	217	229	71				
1983	19	14	1631	1150	466	229				
1984	242	18	2955	500	1812	87				
1985	307	37	3513	429	3508	42				
1986	21	7	176	277	47	23	35	36		
1987	37	21	731	277	589	307	167	49		
1988	85	29	964	336	464	261	208	45	78	43
1989	401	77	3077	1324	401	77	1097	266	2450	29
1990	38	27	932	301	408	105	454	69	56	20
1991	16	19	580	900	92	88			48	38
1992	12	14	1832	1098	344	56			135	31
1993	42	24	1268	435	130	113			49	130
1994: Top	47	34	6525	4355	198	144			220	150
1994: Bottom			1266	243						
1995: Top	62	43	786	660	197	169			124	134
1995: Bottom			406	280						

Blank cells indicate no data available.

Shaded areas indicate seasonal averages that exceeded total coliform levels of 2400mg/100ml & fecal coliform counts of 200mg/100ml (New York & New Jersey State bacterial standard limits).

Gateway Total Coliform Seasonal Averages, 1982-1995



Gateway Fecal Coliform Seasonal Averages, 1982-1995

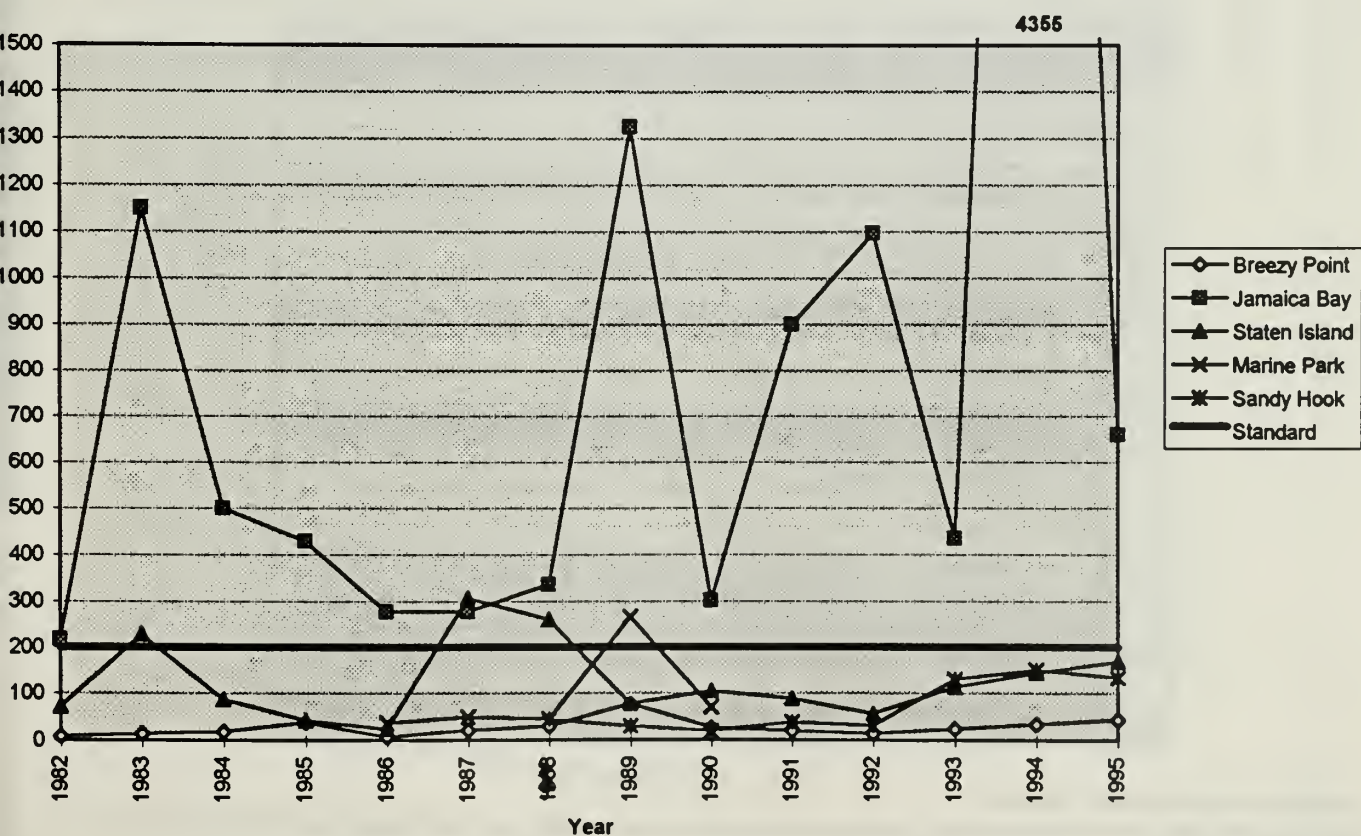


Figure 1

Table III
Sample Days Surpassing Coliform Criteria
1995

Site	Sample Days		
	Total Number	# Surpassing Criteria	% Surpassing Criteria
ATL-1	14	0	0
ATL-2	14	0	0
Atlantic Beach Averages	14	0	0
RI-3 Top	14	2	14.29
RI-3 Bottom	10	1	10.00
RB Top	14	4	28.57
RB Bottom	14	1	7.14
BC Top	14	1	7.14
BC Bottom	14	0	0
JFKS Top	10	2	20.00
JFKS Bottom	10	0	0
JFKN Top	14	7	50.00
JFKN Bottom	10	3	30.00
JB-9 Top	14	13	92.86
JB-9 Bottom	14	9	64.29
BB Top	14	10	71.43
BB Bottom	14	13	92.86
JB-6A Top	14	4	28.57
JB-6A Bottom	14	4	28.57
PAL Top	14	10	71.43
PAL Bottom	14	9	64.29
Jamaica Bay Ave. Top	13.5	5.8	42.96
Jamaica Bay Ave Bottom	12.6	4.4	34.92
FW-1	14	2	14.29
SB-2	14	1	7.14
MB-3	14	1	7.14
NDB-4	14	2	14.29
OB-5	14	2	14.29
GK-6	14	0	0
CP-7	13	0	0
GKM-8	14	2	14.29
Staten Island Averages	13.8	1.2	8.69
SH-1	13	4	28.57
SH-2	13	5	35.71
SH-3	14	1	7.14
SH-4	14	1	7.14
SH-5	14	1	7.14
SH-6	13	3	23.08
Sandy Hook Averages	13.5	2.5	18.52

Bathing beach sites are shaded.

Note: No beaches were closed during 1995 due to bacterial contamination, even though standards may have been exceeded on initial counts.

Percentage of Sample Days Surpassing Coliform Criteria

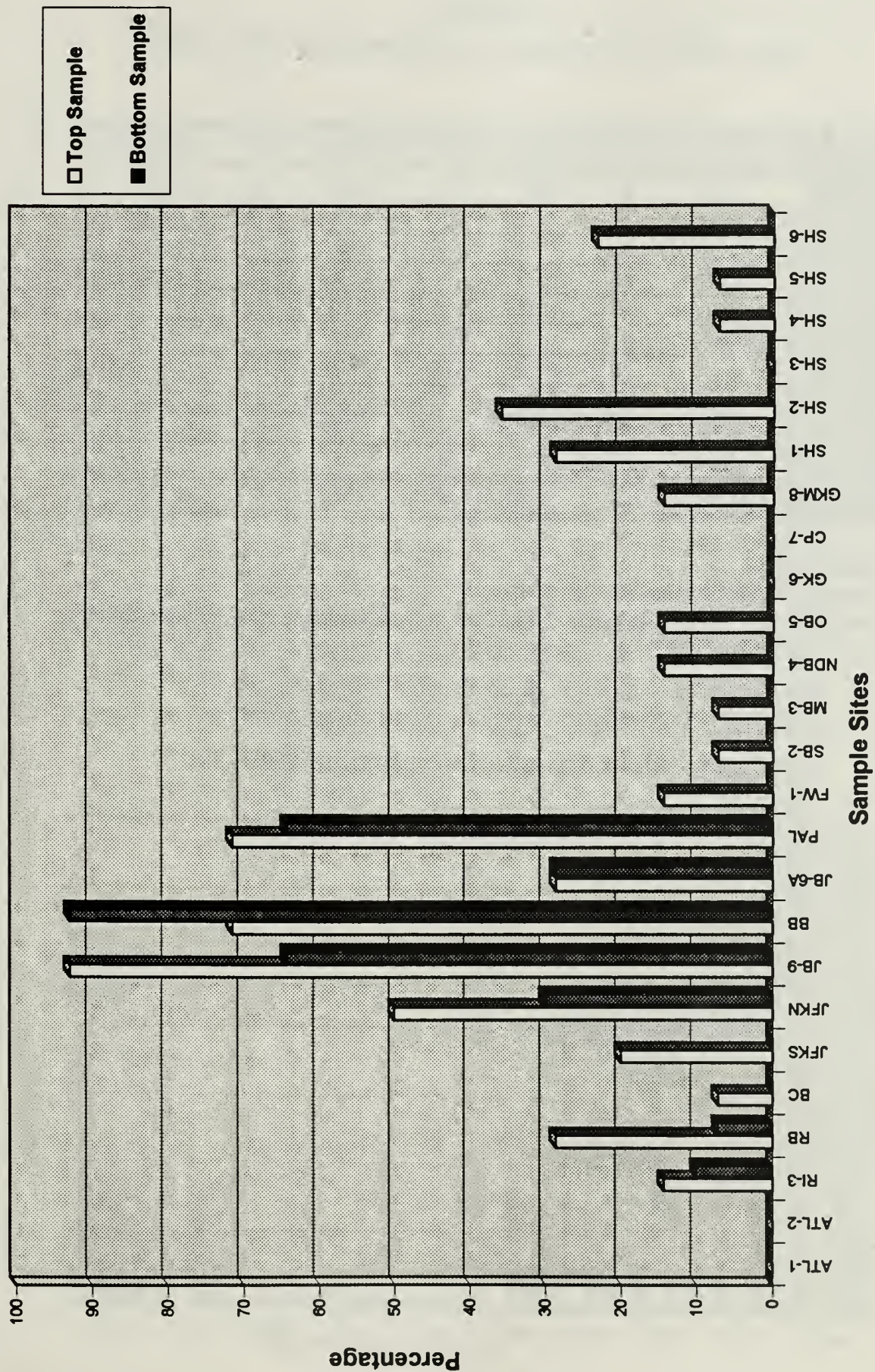


Figure 2

Table IV
June, July, & August Precipitation, 1986-1995

Year	June	July	August	Total
1986*	1.86	5.56	4.42	11.66
1987*	4.22	3.71	3.84	11.77
1988*	1.29	8.14	2.19	11.62
1989*	8.47	5.99	8.35	22.81
1990*	2.50	3.51	12.36	18.37
1991*	N/D	N/D	N/D	N/D
1992	0.08	0.24	0.22	0.55
1993**	0.24	0.08	0.09	0.27
1994**	3.17	2.54	7.07	12.75
1995**	2.94	3.56	0.25	6.73
Average	2.73	3.70	4.31	10.72

N/D: No Data.

* Precipitation for the New York Area

** Precipitation for Floyd Bennett Field taken from Gateway NRA's weather station.

June, July & August Precipitation, 1986-1995

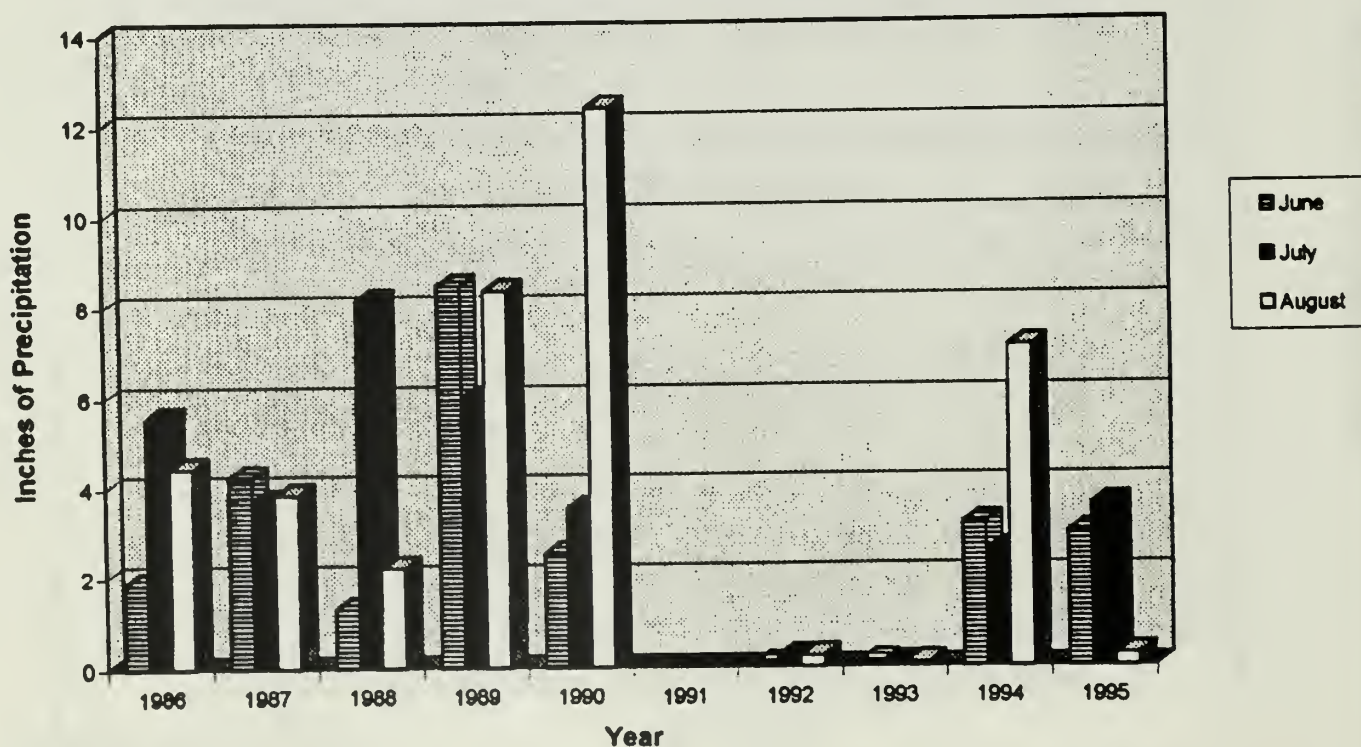
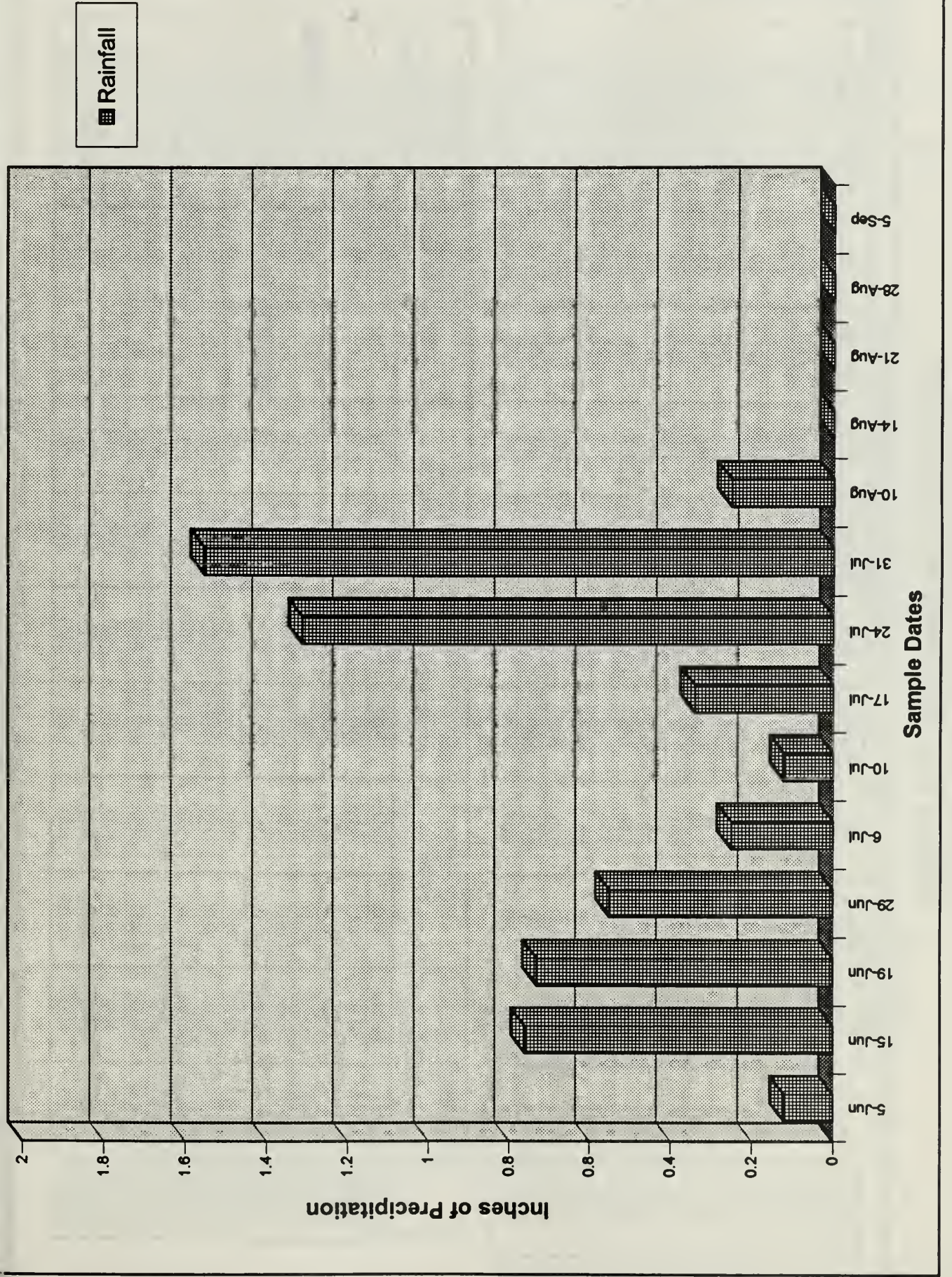


Figure 3

Figure 4



Environmental Water Quality Monitoring Jamaica Bay: Rockaway Inlet [RI-3], 1995

Date	Time	Air Temp(°F)	Water Temp (°C)		pH		Salinity (ppt)		Conductivity MMHO/cm		DO		Nitrates (mg/l)	
			Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	0800	78	18.0	17.0	8.40	8.10	22.0	23.0	290	310	7.9	8.9	N/D	N/D
6/15/95	0740	78	17.9	17.7	7.88	7.91	21.0	21.5	303	300	6.83	6.89	<0.1	<0.1
6/19/95	0750	78	20.1	19.8	7.88	7.98	23.2	23.9	332	338	8.55	7.41	N/D	N/D
6/29/95	0745	69	21.1	21.1	7.58	7.73	18.7	20.2	282	291	5.75	4.64	<0.1	<0.1
7/06/95	0745	71	21.2	21.0	7.80	7.98	22.9	20.7	339	304	6.70	4.90	N/D	N/D
7/10/95	0745	69	19.7	19.3	7.78	7.72	24.2	25.2	342	354	9.55	5.33	<0.1	<0.1
7/17/95	0740	78	21.9	21.7	7.68	7.72	21.3	25.2	320	372	5.17	9.00	N/D	N/D
7/24/95	0755	78	23.1	23.0	7.88	7.98	19.7	20.1	316	319	6.91	5.70	<0.1	<0.1
7/31/95	0800	78	21.6	21.5	7.80	7.50	20.2	22.2	309	328	5.40	5.70	N/D	N/D
8/10/95	0755	70	21.9	21.9	7.76	7.91	24.4	24.9	360	365	5.43	5.32	<0.1	<0.1
8/14/95	0930	80	24.8	N/D	7.88	N/D	20.6	N/D	334	N/D	5.42	N/D	N/D	N/D
8/21/95	1110	80	26.4	N/D	8.22	N/D	26.5	N/D	402	N/D	9.19	N/D	<0.1	N/D
8/28/95	1105	80	23.1	N/D	8.02	N/D	26.6	N/D	407	N/D	9.41	N/D	N/D	N/D
9/05/95	1045	78	24.5	N/D	8.06	N/D	27.5	N/D	391	N/D	9.04	N/D	<0.1	N/D

Date	Total Chlorine mg/l		Free Chlorine mg/l		Phosphate (PO ₄) ppm		Chlorophyll a mg/m ³		Total Coliform Counts/100 ml		Fecal Coliform Counts/100 ml	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0	29	0	0
6/15/95	<0.05	<0.05	<0.05	<0.05	0.05	0.05	N/D	N/D	116	0	29	0
6/19/95	N/D	N/D	N/D	N/D	N/D	N/D	8.848	21.384	0	0	0	0
6/29/95	<0.05	<0.05	<0.05	<0.05	0.34	0.08	N/D	N/D	174	348	58	203
7/06/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0	0	29	29
7/10/95	<0.05	<0.05	<0.05	<0.05	0.22	0.14	N/D	N/D	2610	464	29	145
7/17/95	N/D	N/D	N/D	N/D	N/D	N/D	4.108	2.062	29	29	0	0
7/24/95	<0.05	<0.05	<0.05	<0.05	0.22	0.06	N/D	N/D	174	1682	145	116
7/31/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0	29	0	29
8/10/95	<0.05	<0.05	<0.05	<0.05	0.15	0.34	N/D	N/D	0	0	0	0
8/14/95	N/D	N/D	N/D	N/D	N/D	N/D	4.992	N/D	87	N/D	174	N/D
8/21/95	<0.05	N/D	<0.05	N/D	0.10	N/D	N/D	N/D	145	N/D	145	N/D
8/28/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	203	N/D	435	N/D
9/05/95	<0.05	N/D	<0.05	N/D	0.11	N/D	4.400	N/D	319	N/D	145	N/D

Shaded area indicates samples that exceeded total coliform counts of 2400/100ml and fecal coliform counts of 200/100ml (New York & New Jersey State bacterial standard limits).
N/D: No Data

Rockaway Inlet (RI-3) Water Quality Measurements, 1995

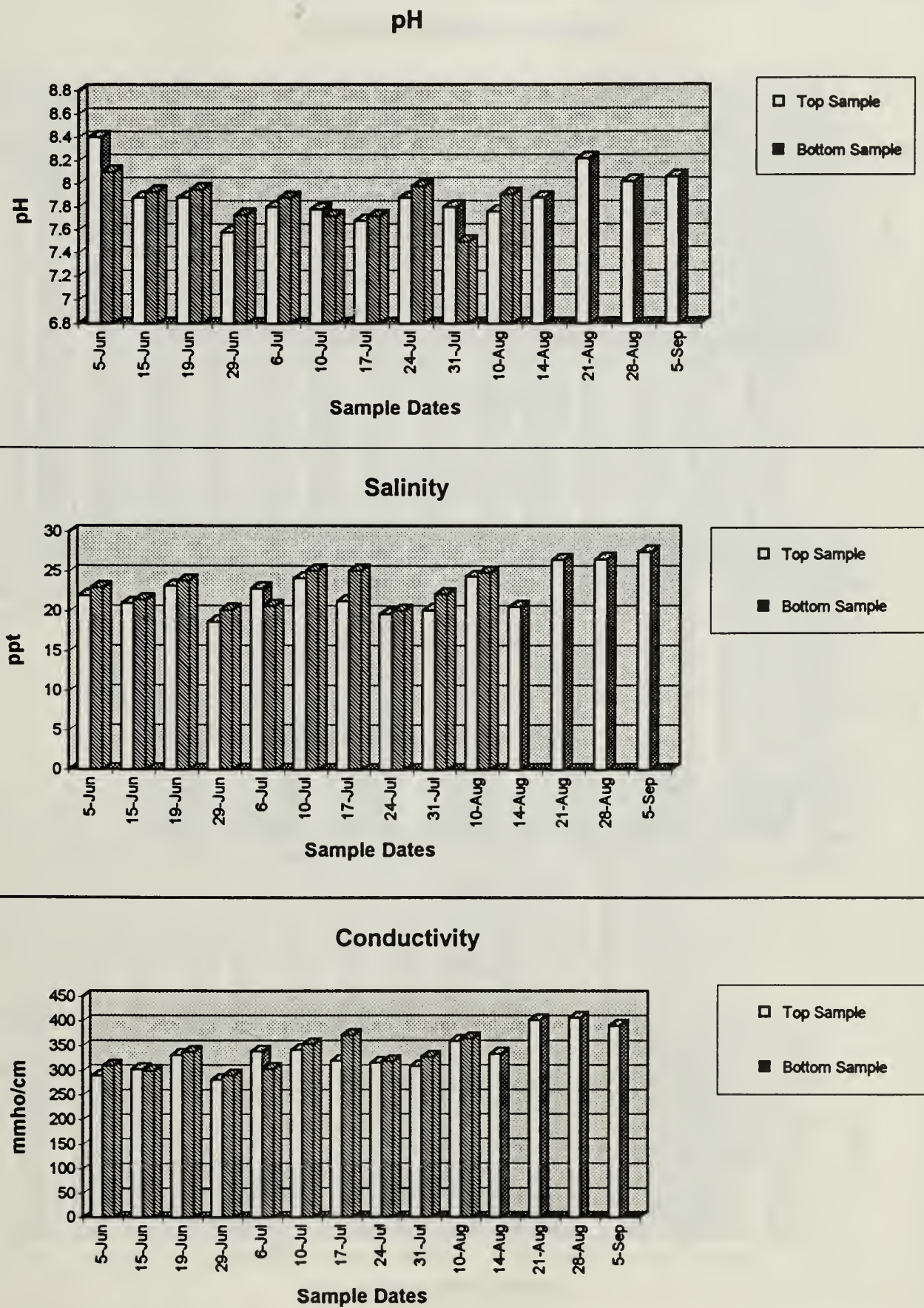
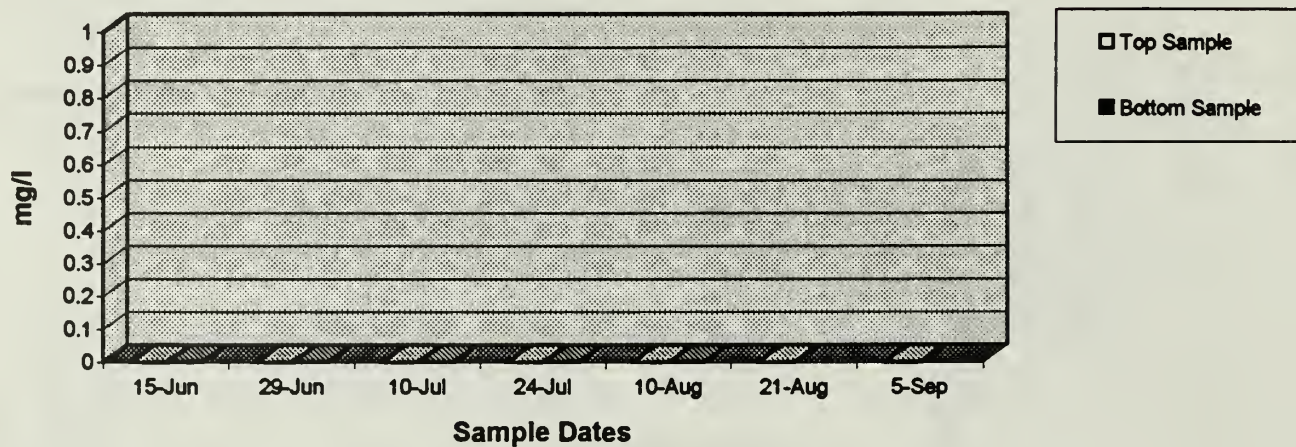


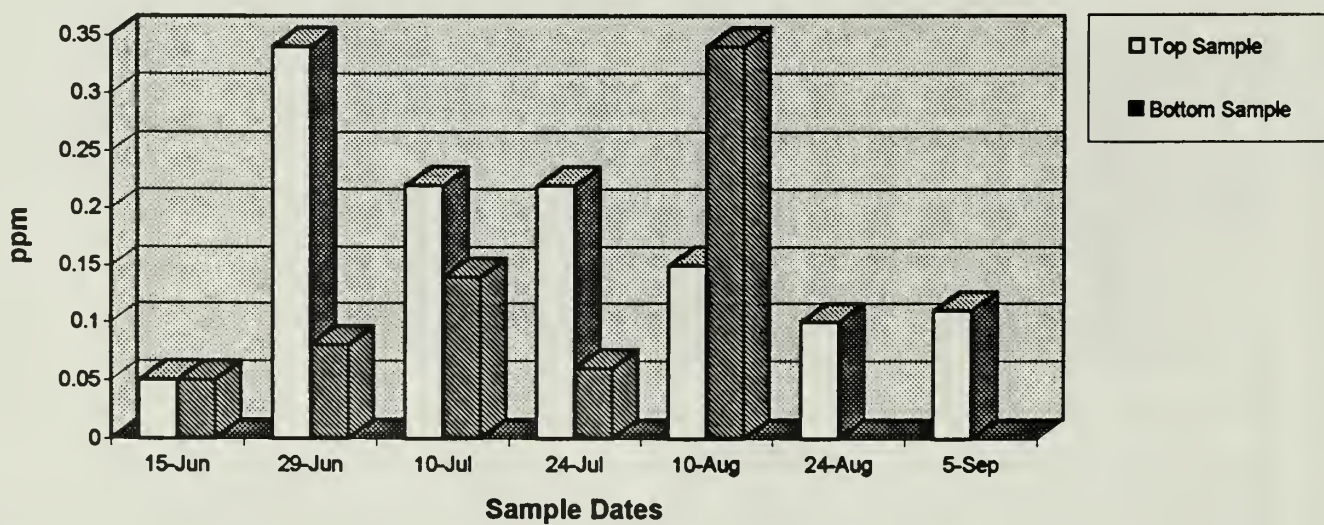
Figure 5

Rockaway Inlet (RI-3) Water Quality Measurements, 1995

Nitrates (All samples <0.1)



Phosphate (PO₄)



Chlorophyll a

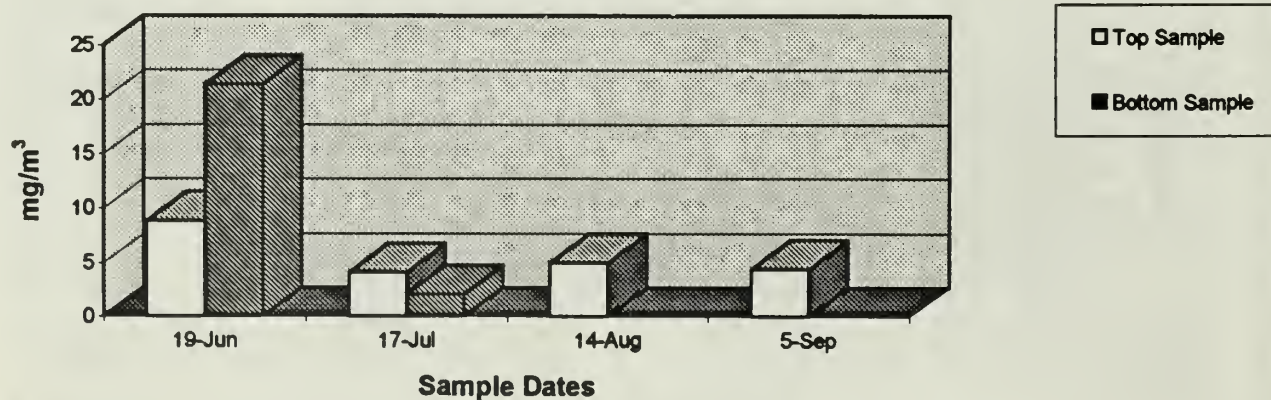
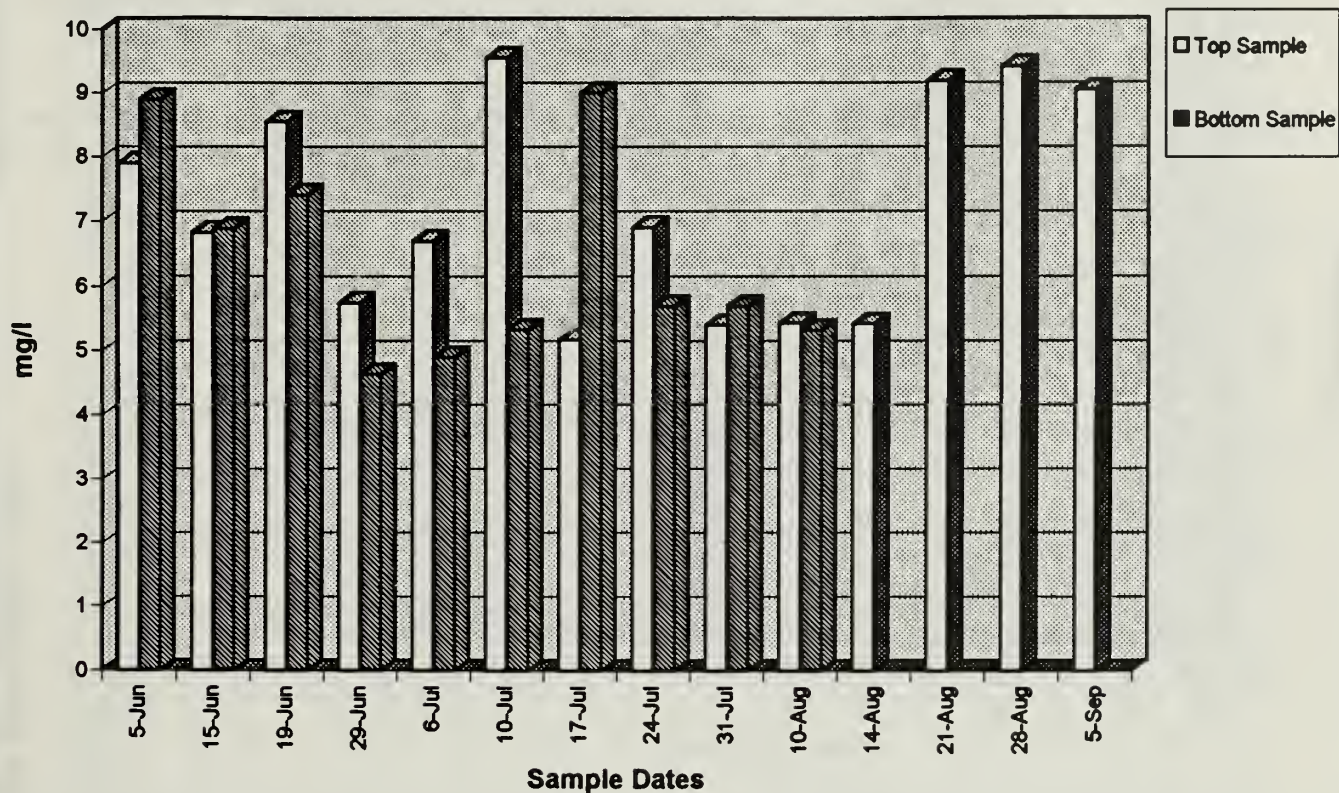


Figure 6

Rockaway Inlet (RI-3) Water Quality Measurements, 1995

Dissolved Oxygen



Water Temperature

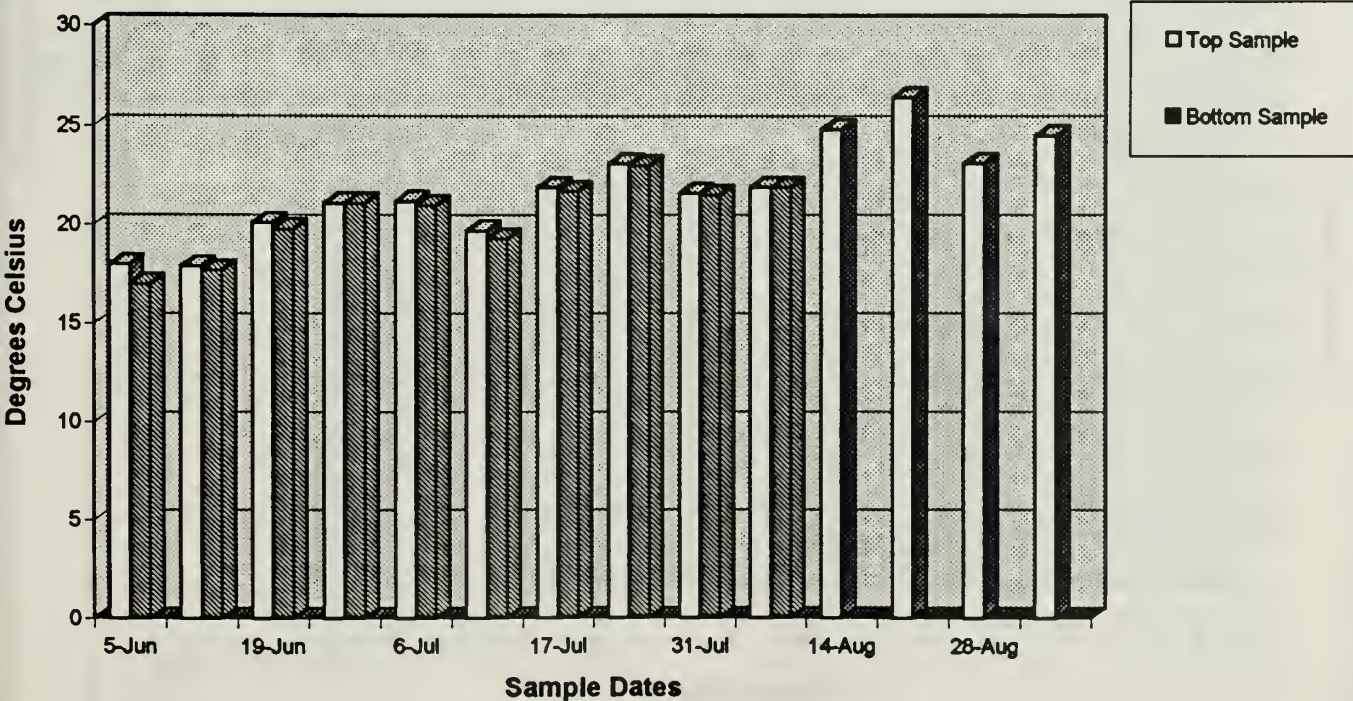
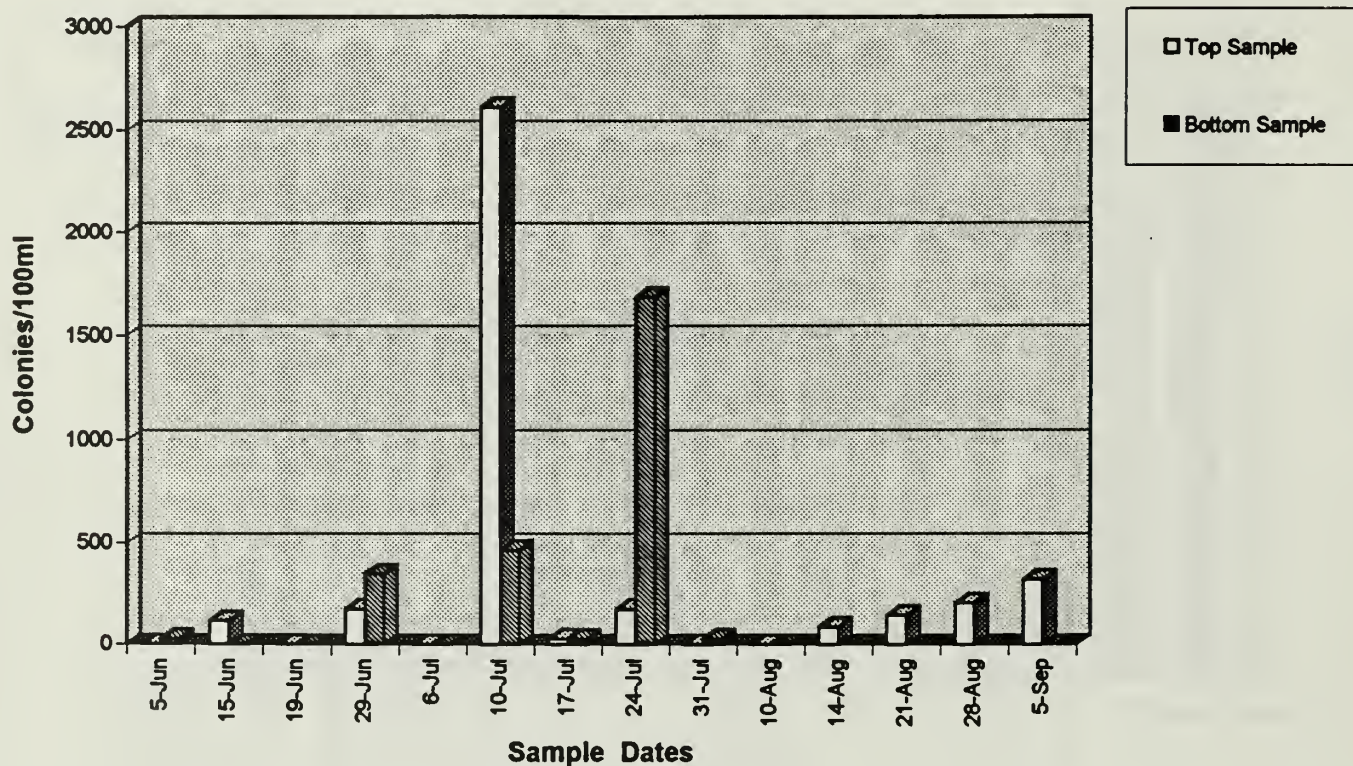


Figure 7

Rockaway Inlet Water Quality Measurements, 1995

Total Coliform Counts



Fecal Coliform Counts

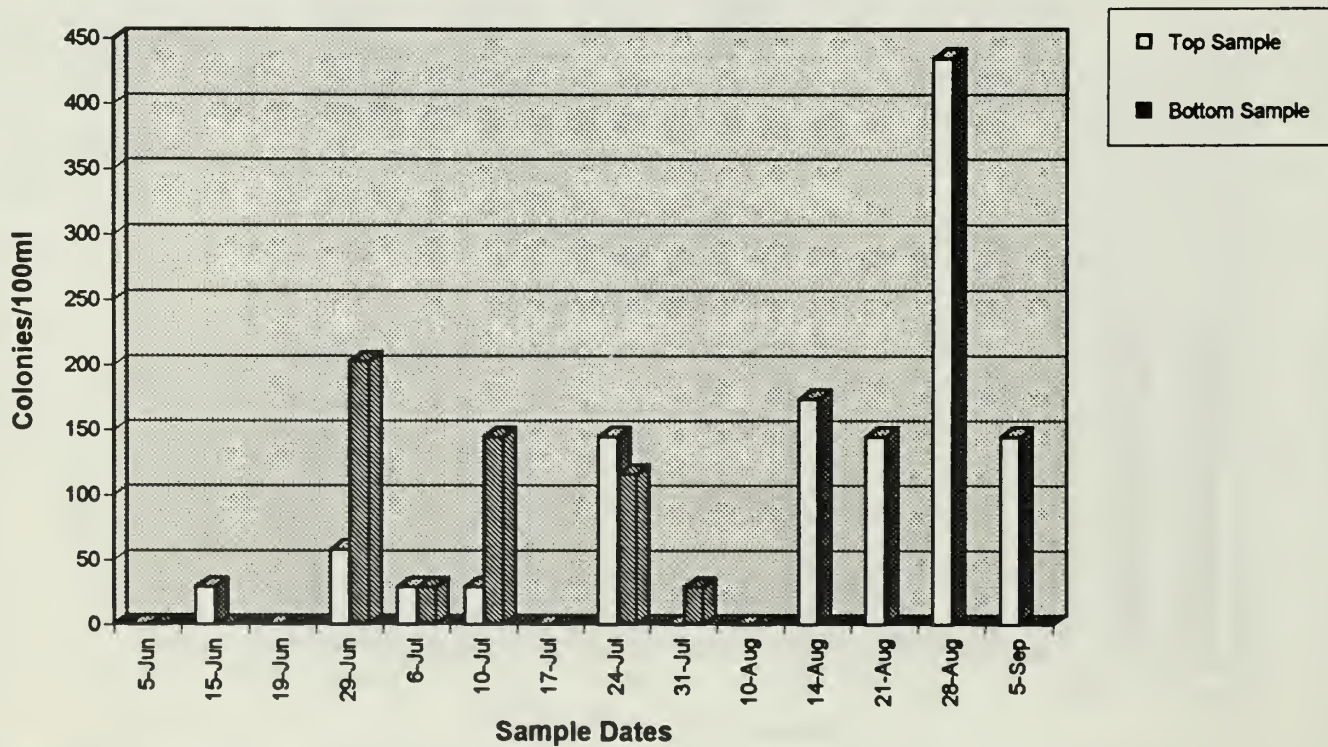


Figure 8

Jamaica Bay: Ruffle Bar [RB], 1995

Date	Time	Air Temp(°F)	Water Temp (°C)		pH		Salinity (ppt)		Conductivity MMHO/cm		DO (mg/l)		Nitrates (mg/l)	
			Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	0820	79	18.0	18.0	7.90	7.50	23.4	23.5	320	321	8.20	8.00	N/D	N/D
6/15/95	1000	79	19.8	19.5	8.12	8.00	23.7	23.7	341	341	7.84	6.03	<0.1	<0.1
6/19/95	0953	N/D	21.3	21.1	8.30	8.27	24.9	24.5	365	361	9.19	7.67	N/D	N/D
6/29/95	0940	76	19.7	19.6	7.86	7.84	25.5	25.6	354	352	5.41	4.83	0.12	0.10
7/06/95	1015	88	23.1	23.0	8.17	8.08	24.6	27.4	360	322	6.24	4.95	N/D	N/D
7/10/95	0940	72	22.0	21.9	7.92	7.91	27.3	27.5	362	367	4.71	4.52	0.21	0.22
7/17/95	0935	76	23.6	23.4	7.74	7.75	26.1	26.2	392	394	4.29	4.31	N/D	N/D
7/24/95	0955	90	25.6	25.5	7.91	7.91	25.4	24.8	397	405	3.86	4.45	0.24	0.23
7/31/95	1015	80	23.9	23.1	7.30	8.10	25.2	25.0	397	392	8.30	6.90	N/D	N/D
8/10/95	1010	81	23.3	23.0	7.91	7.94	24.1	21.8	369	332	4.63	5.43	0.14	0.10
8/14/95	1115	86	25.9	25.3	7.91	7.90	25.5	25.2	405	392	9.09	9.31	N/D	N/D
8/21/95	1015	86	25.6	25.3	8.16	8.16	26.9	26.7	400	404	9.33	9.26	0.13	0.13
8/28/95	1015	79	23.2	23.0	7.95	7.90	28.7	28.5	405	405	9.26	9.13	N/D	N/D
9/05/95	1020	78	24.1	24.1	7.52	7.59	27.0	27.1	401	407	9.08	9.19	0.35	0.35

Date	Total Chlorine mg/l		Free Chlorine mg/l		Phosphate (PO ₄) ppm		Chlorophyll a mg/m ³		Total Coliform Colonies/100 ml		Fecal Coliform Colonies/100 ml	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	29	87	0	29
6/15/95	<0.05	<0.05	<0.05	<0.05	0.04	0.63	N/D	N/D	0	116	TNTC	29
6/19/95	N/D	N/D	N/D	N/D	N/D	N/D	6.786	13.588	783	116	116	29
6/29/95	<0.05	<0.05	<0.05	<0.05	0.11	0.12	N/D	N/D	174	261	203	29
7/06/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	319	145	232	87
7/10/95	<0.05	<0.05	<0.05	<0.05	0.17	0.31	N/D	N/D	145	174	87	58
7/17/95	N/D	N/D	N/D	N/D	N/D	N/D	4.416	4.416	290	116	145	29
7/24/95	<0.05	<0.05	<0.05	<0.05	0.16	0.16	N/D	N/D	145	261	29	29
7/31/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	58	0	0	0
8/10/95	<0.05	<0.05	<0.05	<0.05	0.62	0.06	N/D	N/D	0	0	0	0
8/14/95	N/D	N/D	N/D	N/D	N/D	N/D	2.836	7.362	0	29	0	58
8/21/95	<0.05	<0.05	<0.05	<0.05	0.12	0.13	N/D	N/D	5162	5742	11513	15718
8/28/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0	58	29	29
9/05/95	<0.05	<0.05	<0.05	<0.05	0.18	0.26	2.400	4.700	58	174	174	116

N/D: No Data.

TNTC: Too Numerous To Count.

Shaded area indicates samples that exceeded total coliform counts of 2400/100ml and fecal coliform counts of 200/100ml (New York & New Jersey State bacterial standard limits).

Ruffle Bar (RB) Water Quality Measurements, 1995

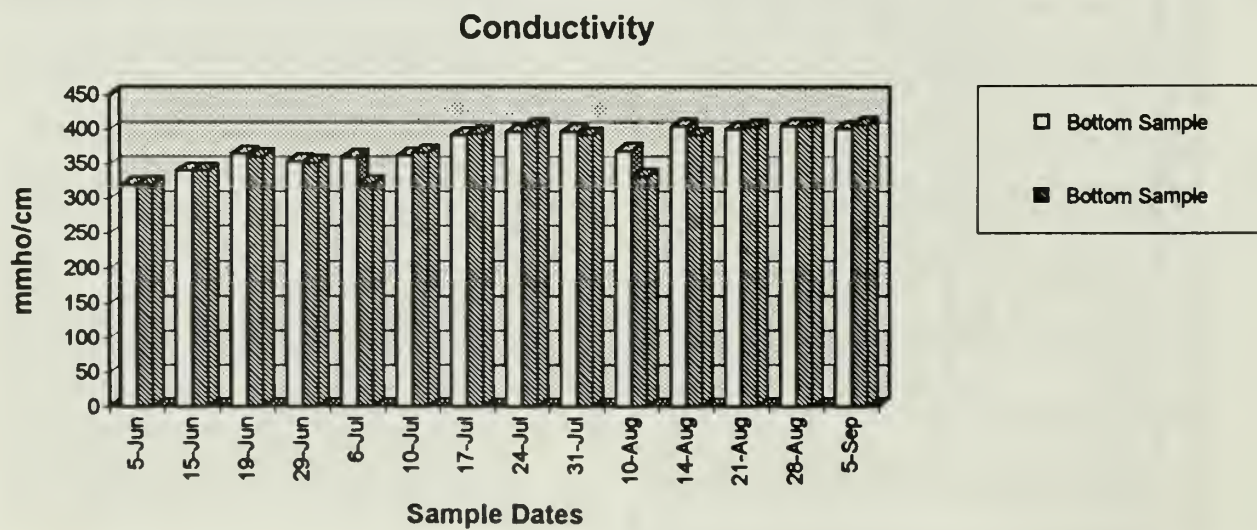
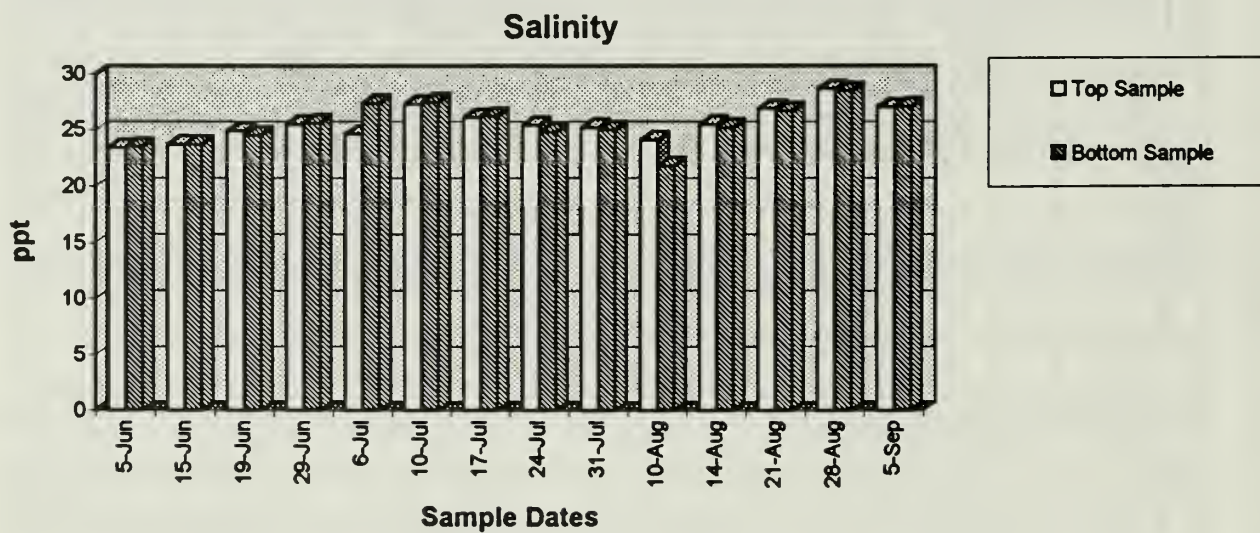
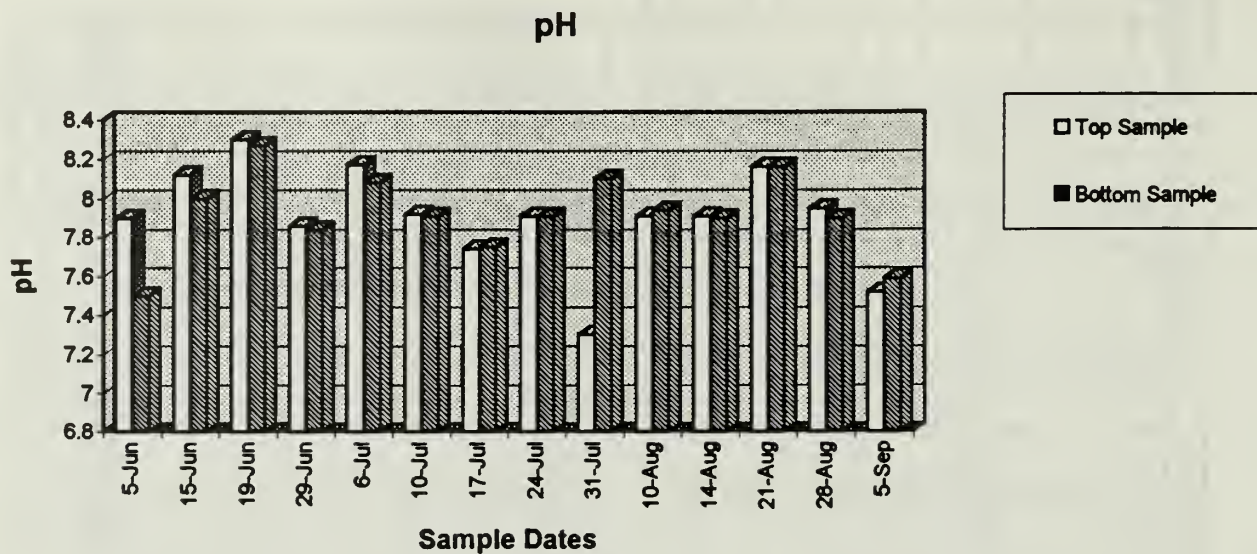
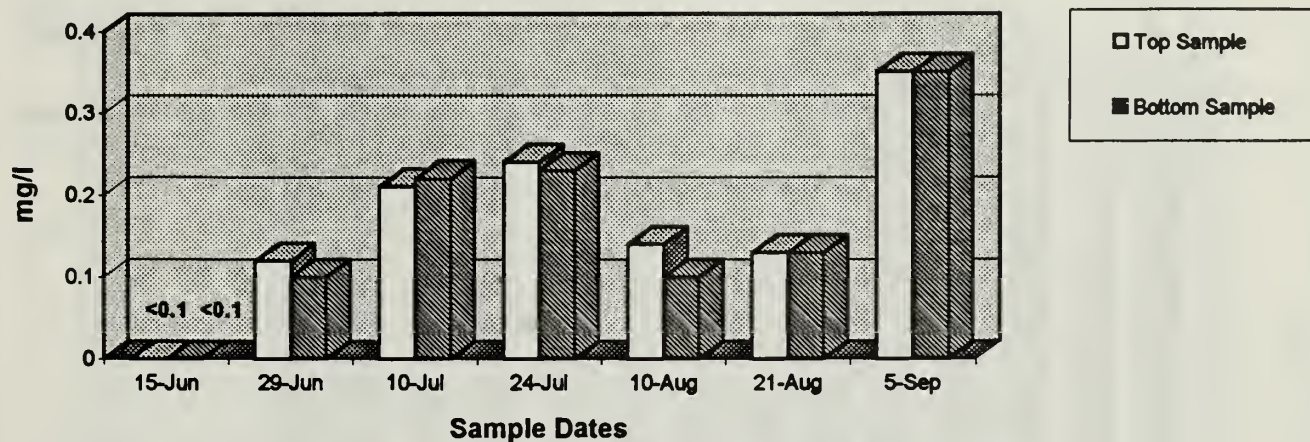


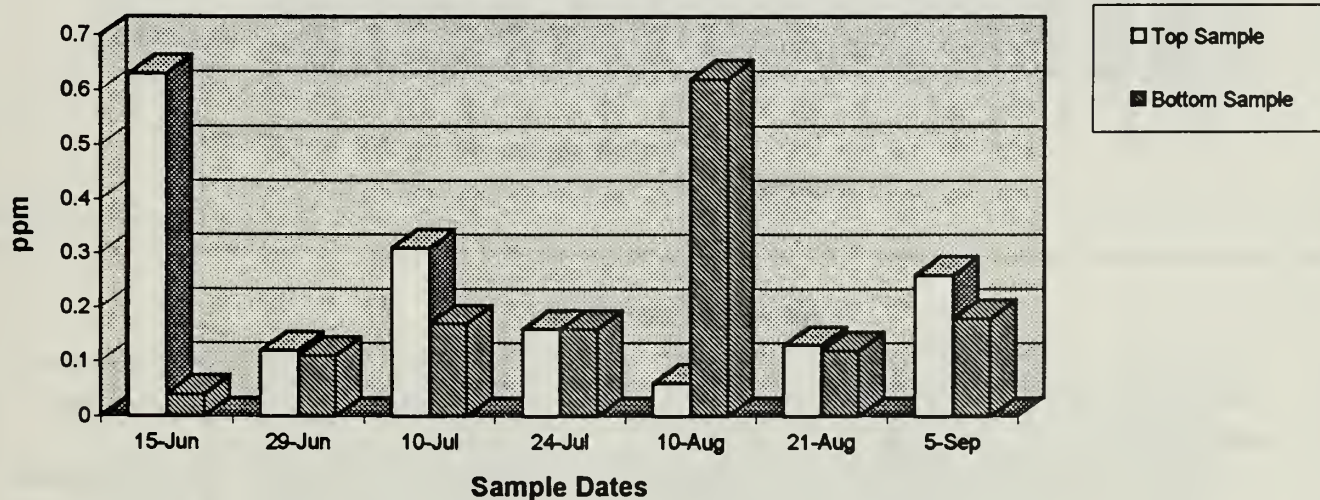
Figure 9

Ruffle Bar (RB) Water Quality Measurements, 1995

Nitrates



Phosphate (PO_4)



Chlorophyll a

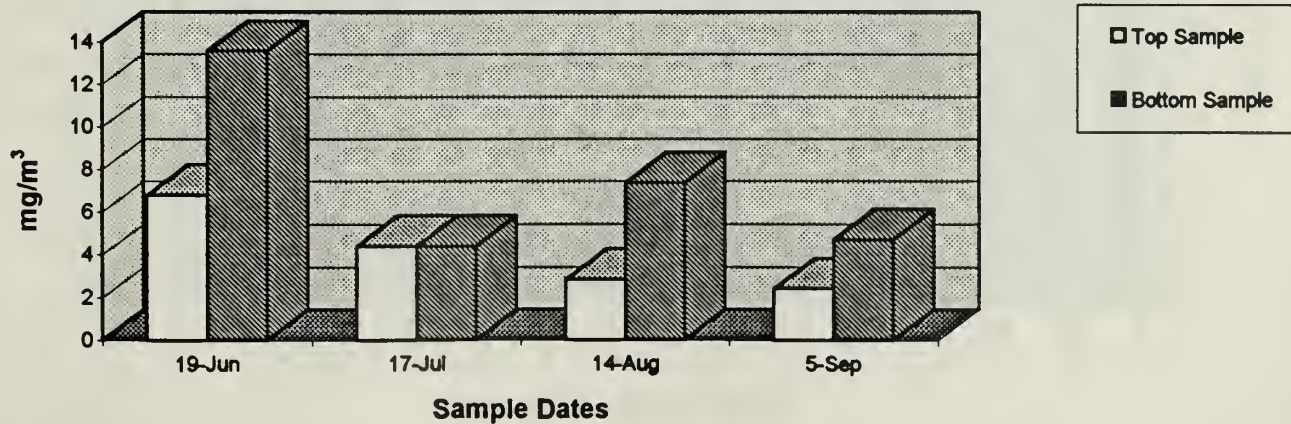
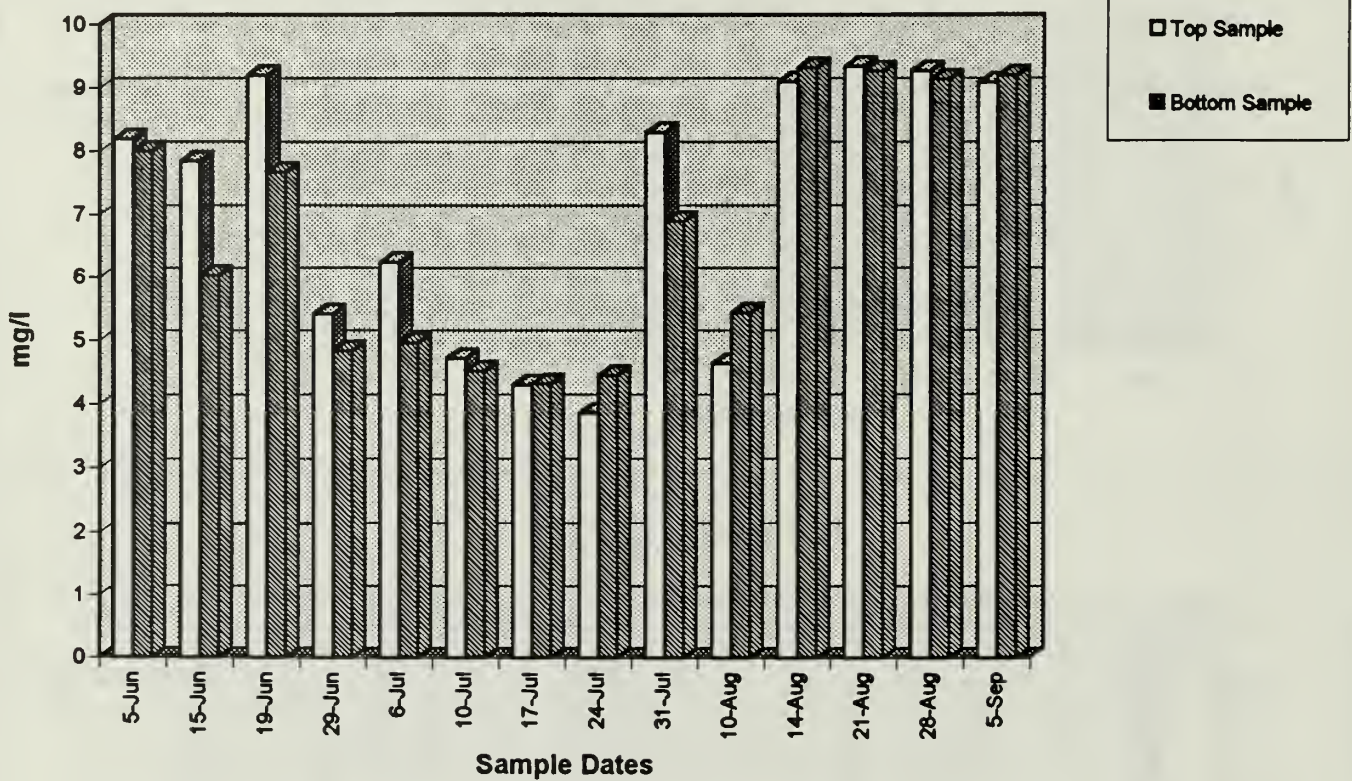


Figure 10

Ruffle Bar (RB) Water Quality Measurements, 1995

Dissolved Oxygen



Water Temperature

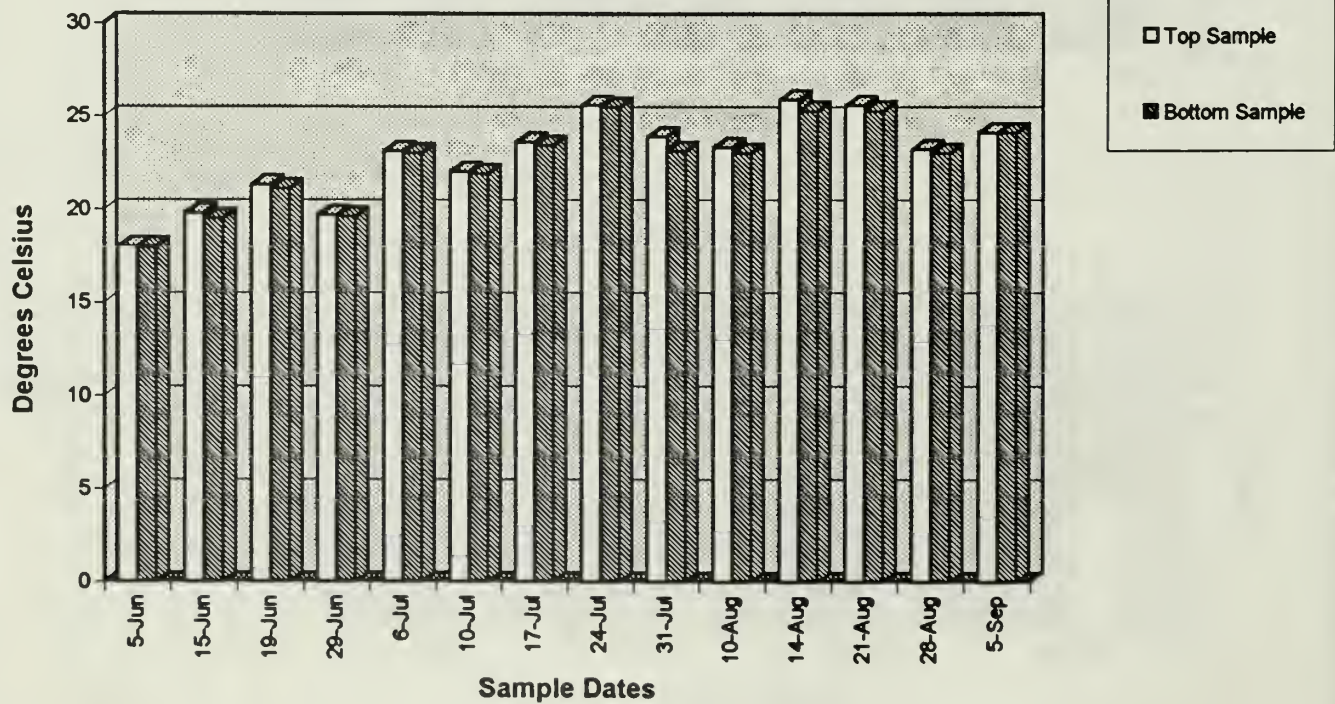
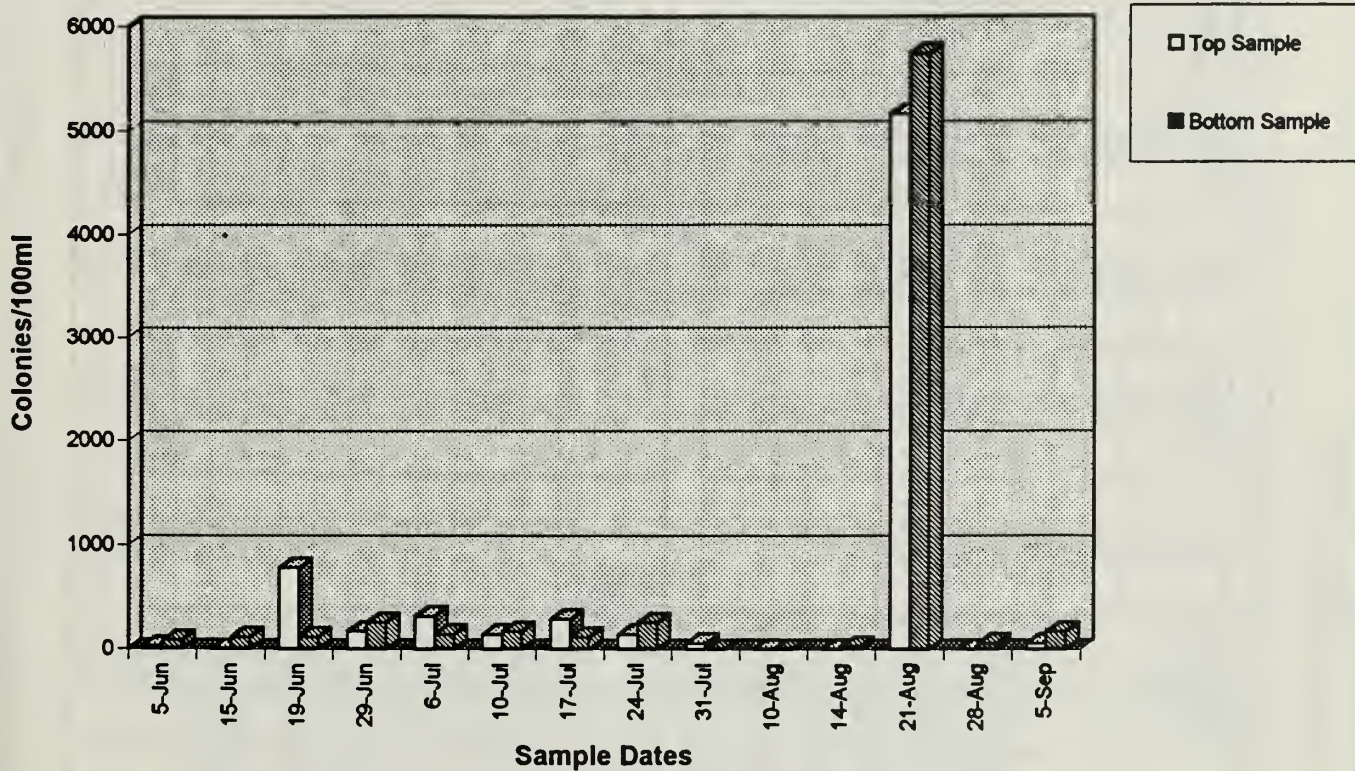


Figure 11

Ruffle Bar (RB) Water Quality Measurements, 1995

Total Coliform Counts



Fecal Coliform Counts

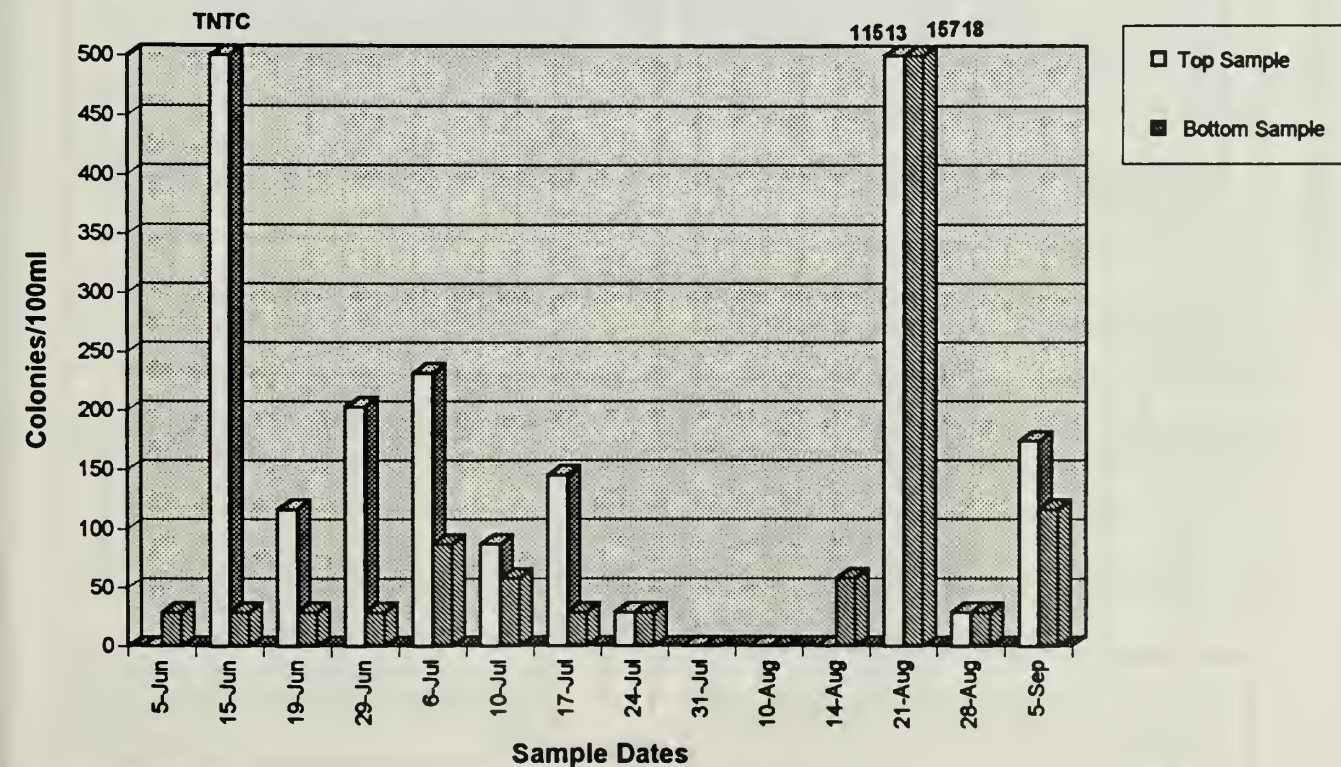


Figure 12

Table VII
Environmental Water Quality Monitoring
Jamaica Bay: Beach Channel [BC], 1995

Date	Time	Air Temp(°F)	Water Temp (°C)		pH		Salinity (ppt)		Conductivity MMHO/cm		DO (mg/l)		Nitrates (mg/l)	
			Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	0830	80	19.0	19.0	8.00	8.00	10.1	21.1	320	316	8.90	8.40	N/D	N/D
6/15/95	0915	75	20.1	19.1	8.19	8.17	23.2	23.1	339	332	6.83	7.70	<0.1	<0.1
6/19/95	0945	N/D	21.2	21.4	8.24	8.25	25.0	24.7	364	360	6.49	5.68	N/D	N/D
6/29/95	0930	74	20.1	19.8	7.79	7.81	25.0	24.5	347	342	8.41	4.52	0.20	0.18
7/06/95	0940	79	22.5	22.3	7.96	8.04	24.2	25.3	352	368	8.51	8.58	N/D	N/D
7/10/95	0932	73	22.3	21.9	7.90	7.88	27.1	26.2	361	358	8.83	8.46	0.27	0.28
7/17/95	0930	75	24.5	24.3	7.72	7.73	27.8	28.2	390	390	4.33	3.45	N/D	N/D
7/24/95	0945	87	25.9	25.8	7.85	7.84	26.8	27.2	390	395	4.54	3.64	0.26	0.22
7/31/95	0955	87	24.8	24.7	7.10	8.20	24.8	24.4	390	392	6.80	7.90	N/D	N/D
8/10/95	0935	76	23.2	23.1	7.85	7.86	24.0	24.7	362	352	4.56	5.13	0.15	0.14
8/14/95	1055	84	25.8	25.7	7.91	7.89	24.8	24.6	392	387	8.79	8.86	N/D	N/D
8/21/95	1030	84	25.8	26.1	7.93	7.94	27.2	27.4	405	407	9.07	8.93	0.25	0.28
8/28/95	1025	79	23.4	23.3	7.94	7.96	24.6	24.9	378	370	8.88	8.85	N/D	N/D
9/05/95	1000	76	24.1	24.2	7.57	7.55	26.9	27.1	398	400	8.64	8.77	0.37	0.37

Date	Total Chlorine mg/l		Free Chlorine mg/l		Phosphate (PO ₄) ppm		Chlorophyll a mg/m ³		Total Coliform Colonies/100 ml		Fecal Coliform Colonies/100 ml	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	29	29	29	29
6/15/95	<0.05	<0.05	<0.05	<0.05	0.05	0.05	N/D	N/D	203	145	29	0
6/19/95	N/D	N/D	N/D	N/D	N/D	N/D	15.310	41.142	145	87	29	0
6/29/95	<0.05	<0.05	<0.05	<0.05	0.42	0.37	N/D	N/D	116	174	143	87
7/06/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	29	58	0	29
7/10/95	<0.05	<0.05	<0.05	<0.05	0.17	0.14	N/D	N/D	348	319	0	145
7/17/95	N/D	N/D	N/D	N/D	N/D	N/D	4.416	4.416	174	290	29	87
7/24/95	<0.05	<0.05	<0.05	<0.05	0.19	0.18	N/D	N/D	551	377	116	58
7/31/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	87	116	87	29
8/10/95	<0.05	<0.05	<0.05	<0.05	0.10	0.50	N/D	N/D	145	29	0	0
8/14/95	N/D	N/D	N/D	N/D	N/D	N/D	9.732	7.362	29	29	58	29
8/21/95	<0.05	<0.05	<0.05	<0.05	0.19	0.23	N/D	N/D	5742	145	15718	116
8/28/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	29	0	87	0
9/05/95	<0.05	<0.05	<0.05	<0.05	0.21	0.16	6.500	4.400	87	58	58	0

Beach Channel (BC) Water Quality Measurements, 1995

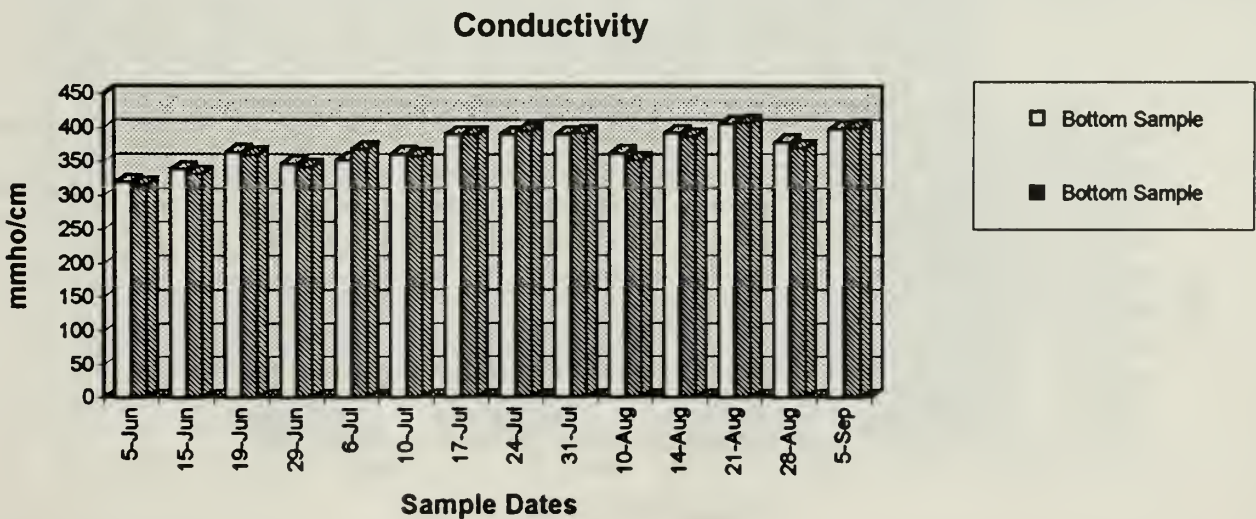
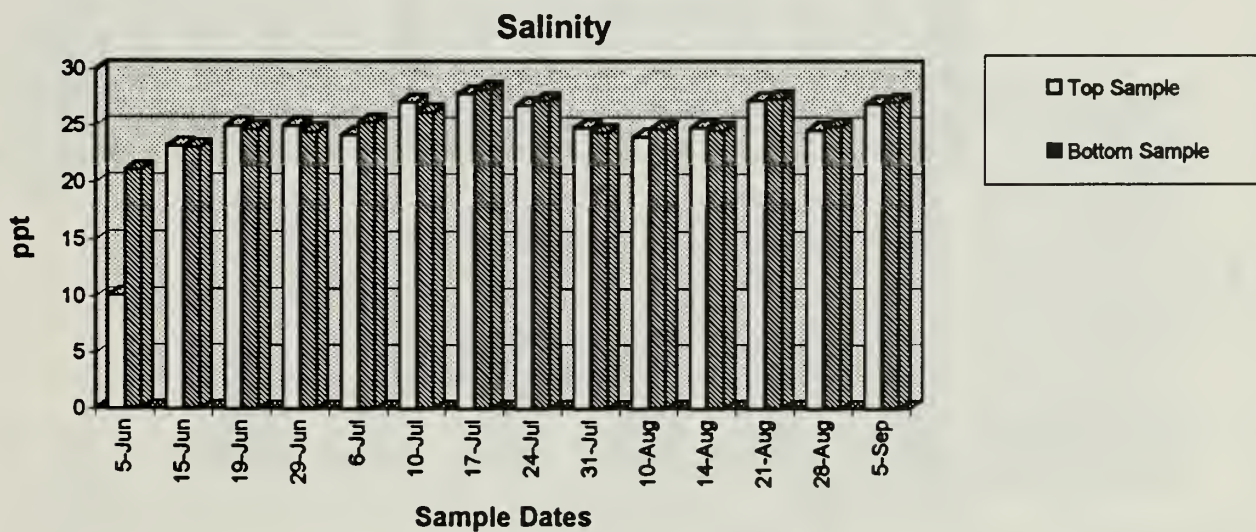
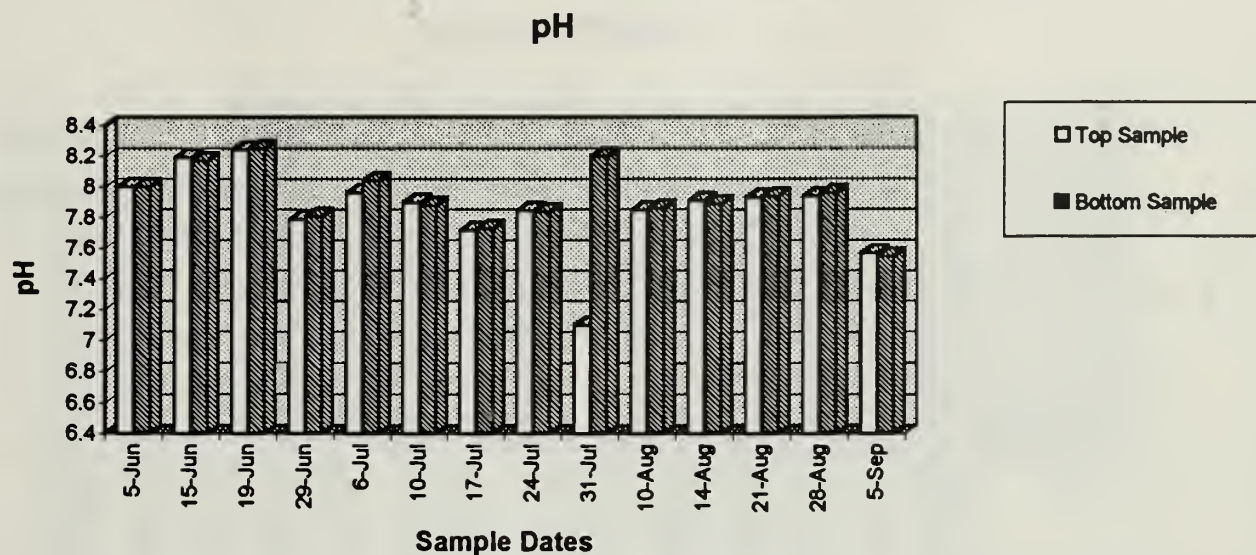
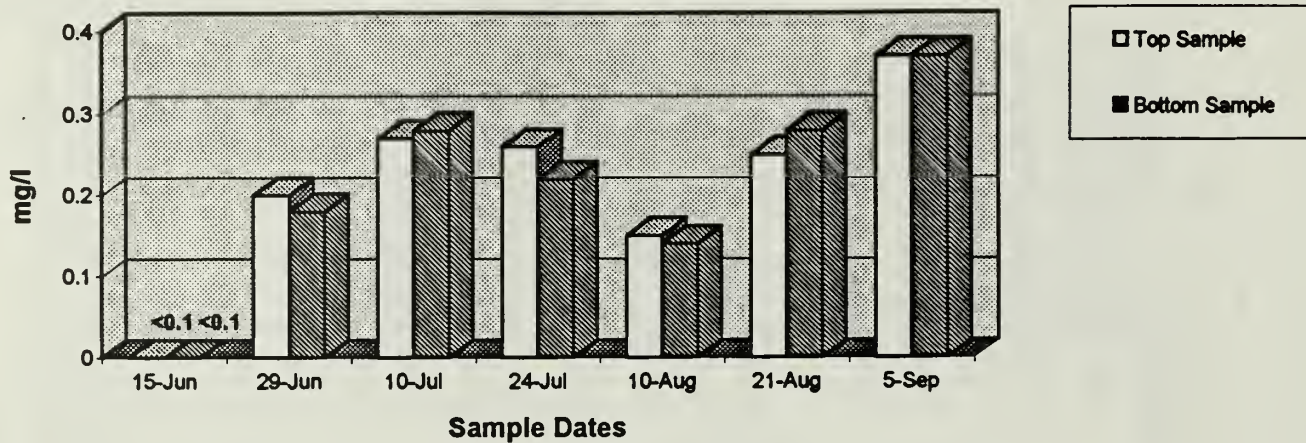


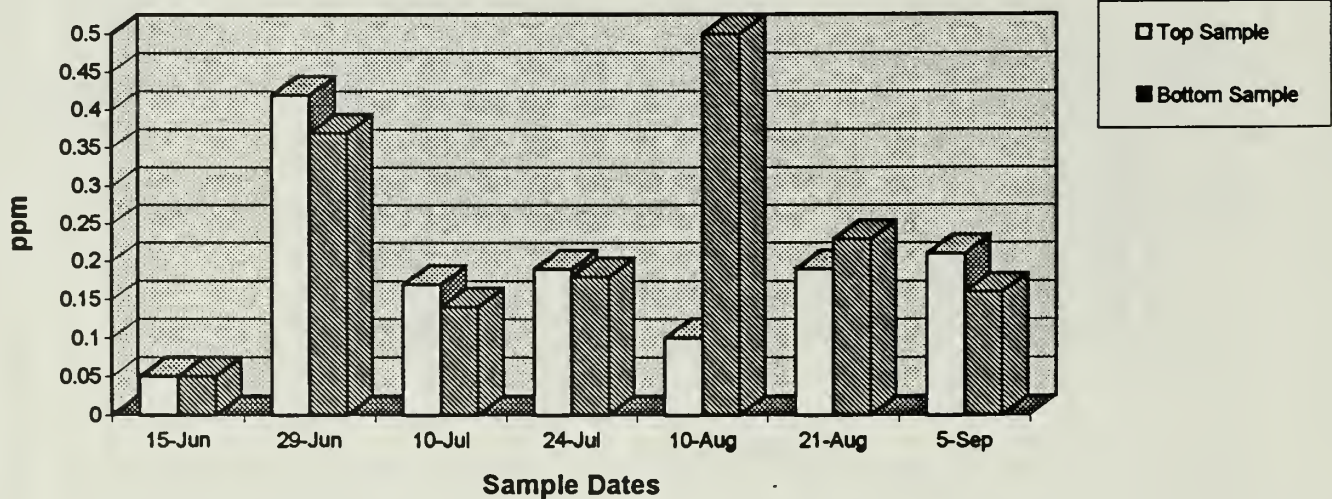
Figure 13

Beach Channel (BC) Water Quality Measurements, 1995

Nitrates



Phosphate (PO_4)



Chlorophyll a

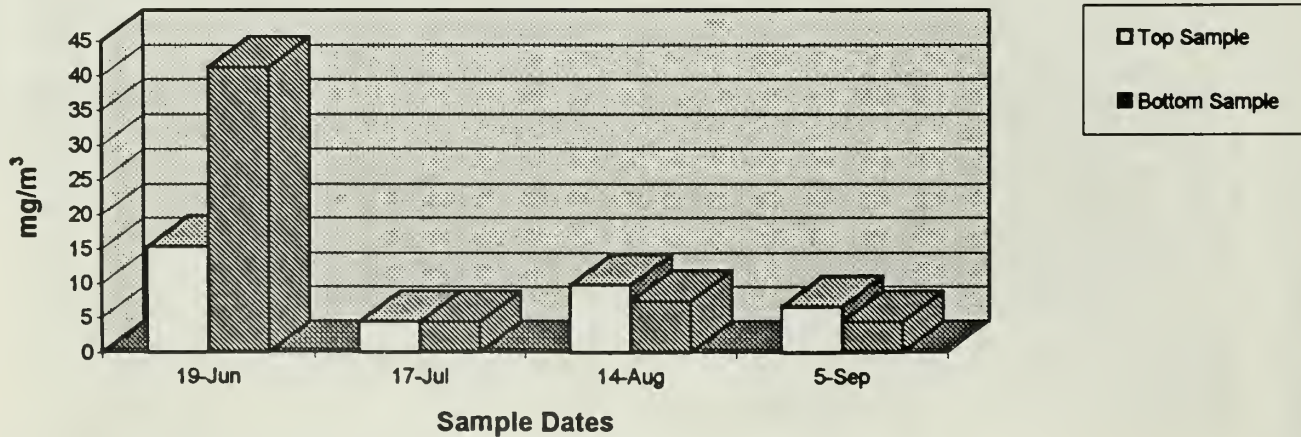
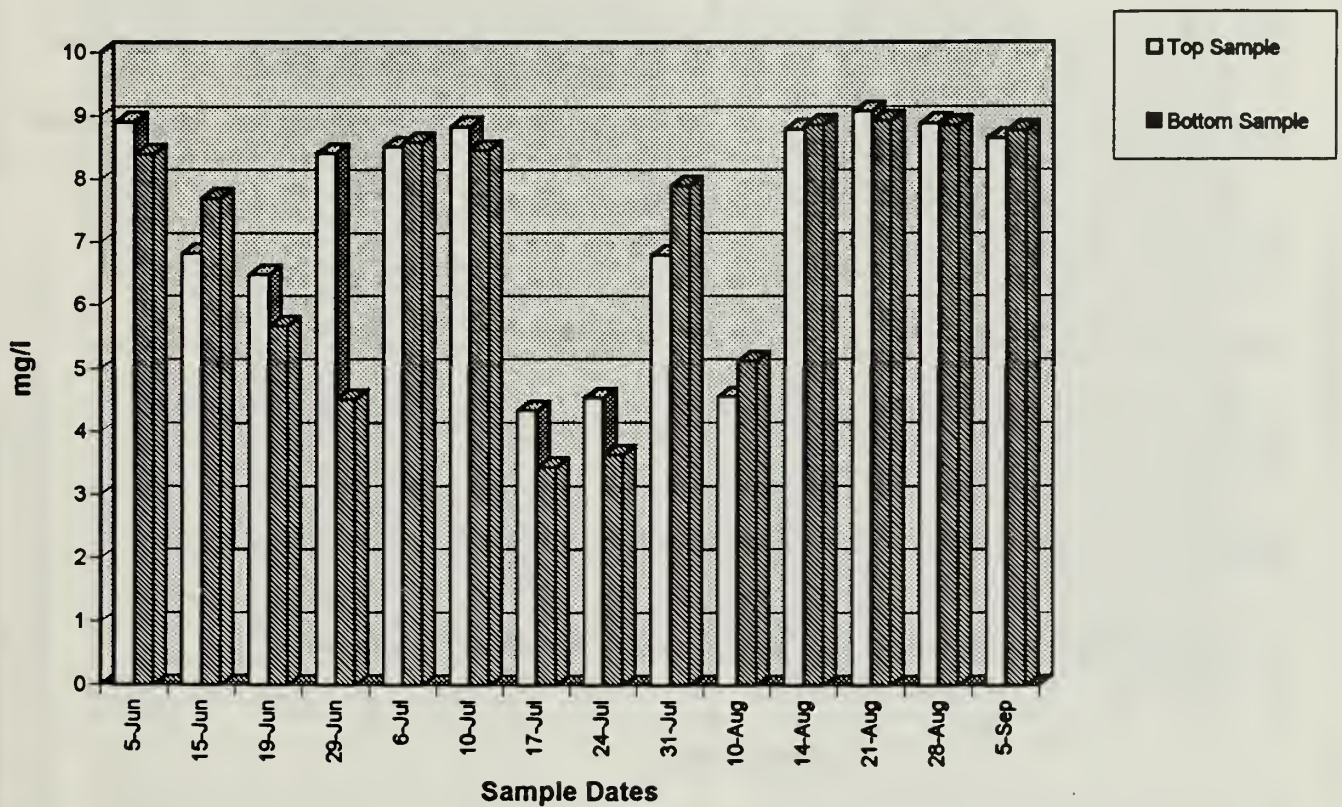


Figure 14

Beach Channel (BC) Water Quality Measurements, 1995

Dissolved Oxygen



Water Temperature

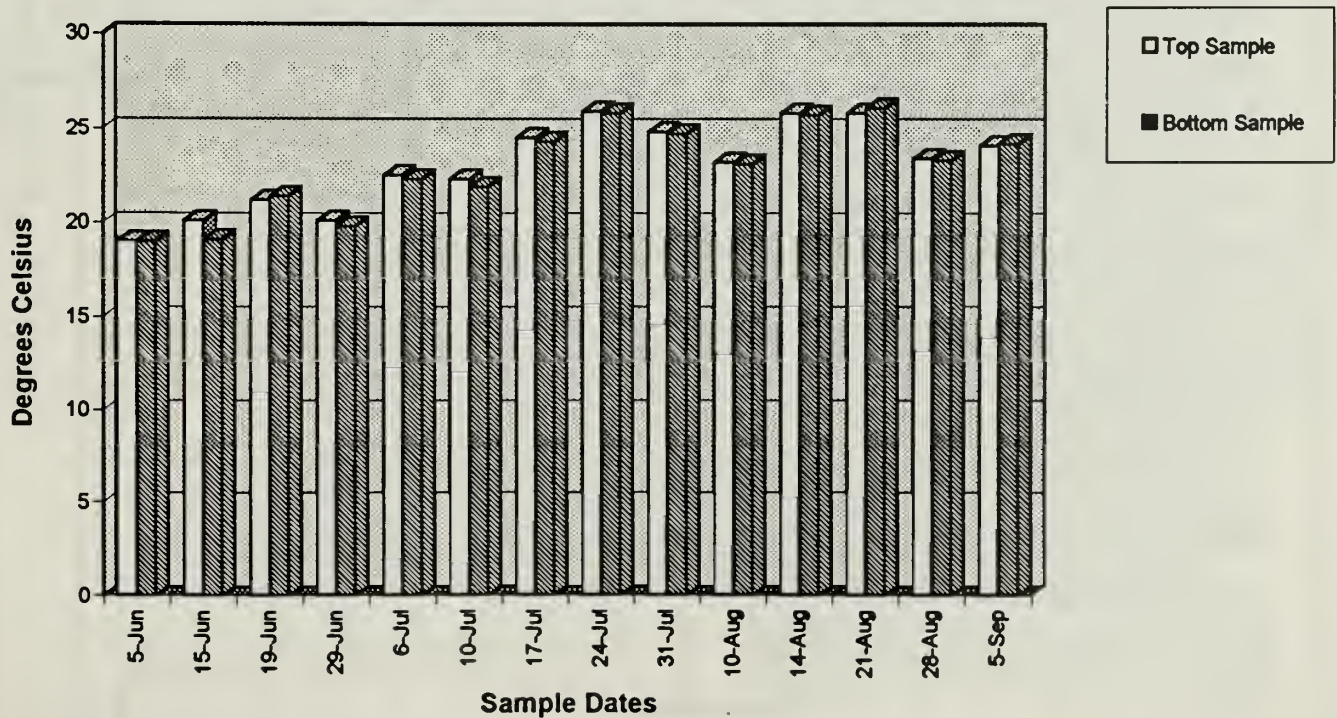
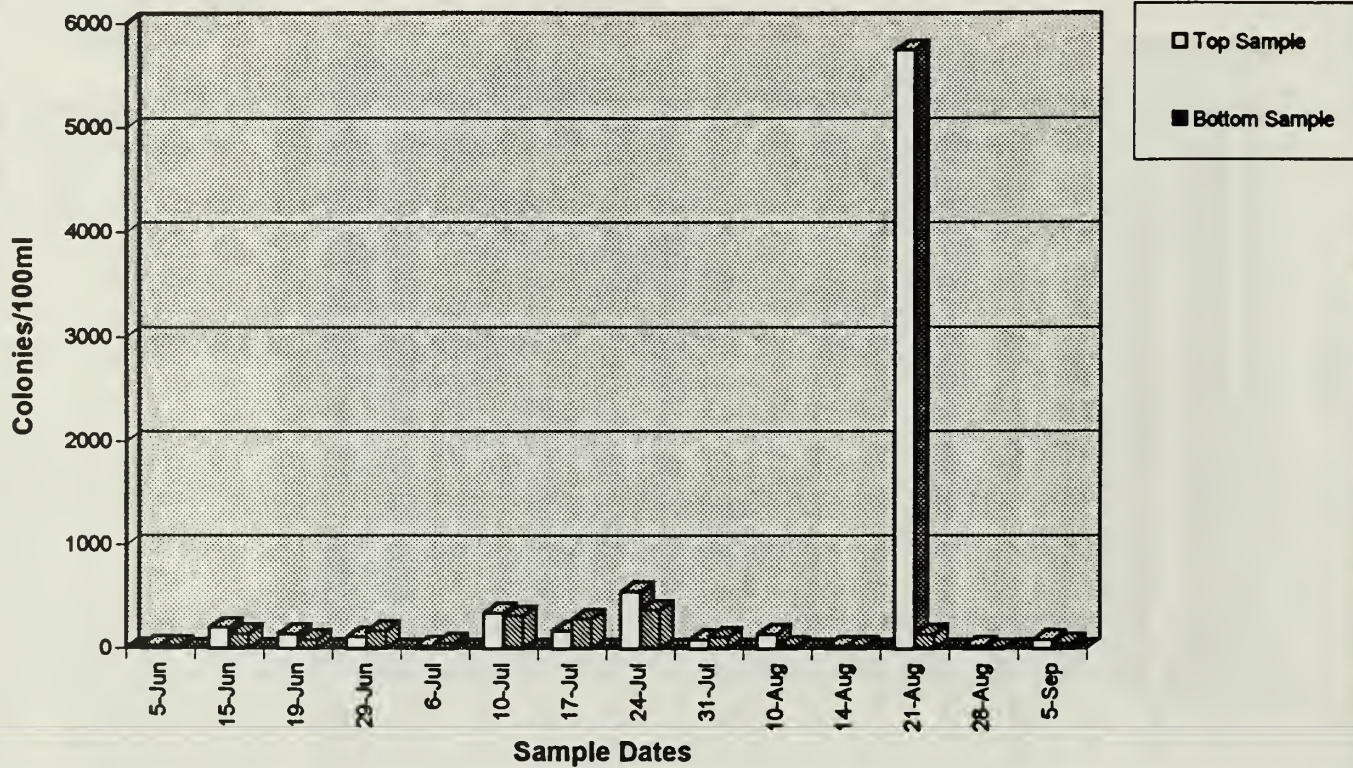


Figure 15

Beach Channel (BC) Water Quality Measurements, 1995

Total Coliform Counts



Fecal Coliform Counts

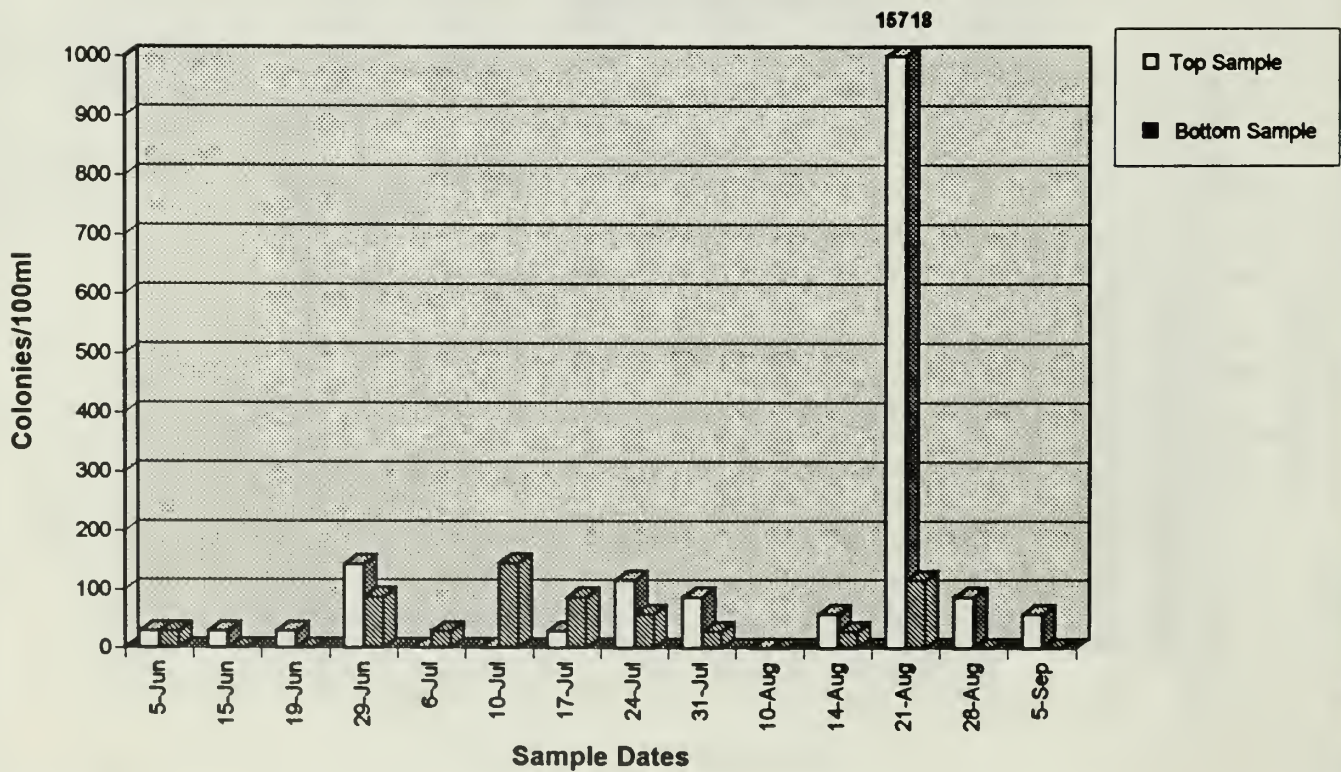


Figure 16

Jamaica Bay: JFK South of Runway Extension [JFKS], 1995

Date	Time	Air Temp(°F)		Water Temp (°C)		pH		Salinity (ppt)		Conductivity MMHO/cm		DO (mg/l)		Nitrates (mg/l)	
		Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	0900	83	19.0	20.0	7.90	23.2	23.9	318	320	8.20	8.10	N/D	N/D	N/D	N/D
6/15/95	0855	74	20.2	20.0	8.33	21.9	21.7	315	319	8.86	7.18	0.21	0.21	N/D	N/D
6/19/95	0920	N/D	22.3	21.9	8.14	24.2	23.8	362	359	6.43	4.56	N/D	N/D	N/D	N/D
6/29/95	0913	66	20.9	20.6	7.77	24.6	24.1	342	332	6.53	4.26	0.12	0.12	N/D	N/D
7/06/95	0925	74	23.2	23.0	8.25	24.9	25.2	363	366	8.33	7.21	N/D	N/D	N/D	N/D
7/10/95	0915	73	23.0	22.8	7.79	26.8	25.9	361	360	3.61	6.17	0.25	0.25	N/D	N/D
7/17/95	0910	75	24.9	24.9	7.75	21.2	24.8	332	338	4.85	4.14	N/D	N/D	N/D	N/D
7/24/95	0935	82	26.6	25.9	7.72	28.2	27.4	385	385	5.57	2.38	0.25	0.25	N/D	N/D
7/31/95	0935	80	27.1	26.9	8.80	23.8	24.8	389	385	6.70	5.80	N/D	N/D	N/D	N/D
8/10/95	0920	74	24.6	23.9	7.90	23.3	23.4	355	354	4.93	4.19	0.15	0.15	N/D	N/D
8/14/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
8/21/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
8/28/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
9/05/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

Date	Total Chlorine mg/l		Free Chlorine mg/l		Phosphate (PO ₄) ppm		Chlorophyll a mg/m ³		Total Coliform Colonies/100 ml		Fecal Coliform Colonies/100 ml	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0	0	0	29
6/15/95	<0.05	<0.05	<0.05	<0.05	0.13	0.13	N/D	N/D	783	522	232	203
6/19/95	N/D	N/D	N/D	N/D	N/D	N/D	11.218	6.400	58	0	0	29
6/29/95	<0.05	<0.05	<0.05	<0.05	0.21	0.24	N/D	N/D	232	609	232	87
7/06/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0	0	0	0
7/10/95	<0.05	<0.05	<0.05	<0.05	0.22	0.22	N/D	N/D	638	29	58	58
7/17/95	N/D	N/D	N/D	N/D	N/D	N/D	8.848	6.154	261	522	145	87
7/24/95	<0.05	<0.05	<0.05	<0.05	0.18	0.19	N/D	N/D	232	174	29	0
7/31/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	29	0	29	0
8/10/95	<0.05	<0.05	<0.05	<0.05	0.23	0.21	N/D	N/D	58	58	29	58
8/14/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
8/21/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
8/28/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
9/05/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

Shaded area indicates samples that exceeded total coliform counts of 2400/100ml and fecal coliform counts of 200/100ml (New York & New Jersey State bacterial standard limits).
N/D: No Data.

JFK South of Runway Extension (JFKS) Water Quality Measurements, 1995

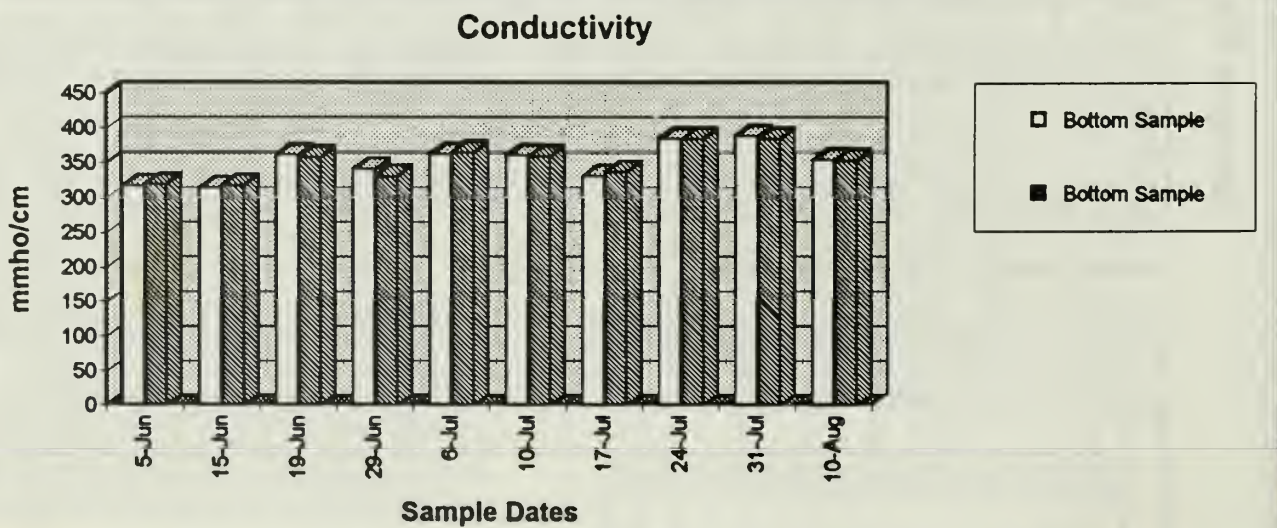
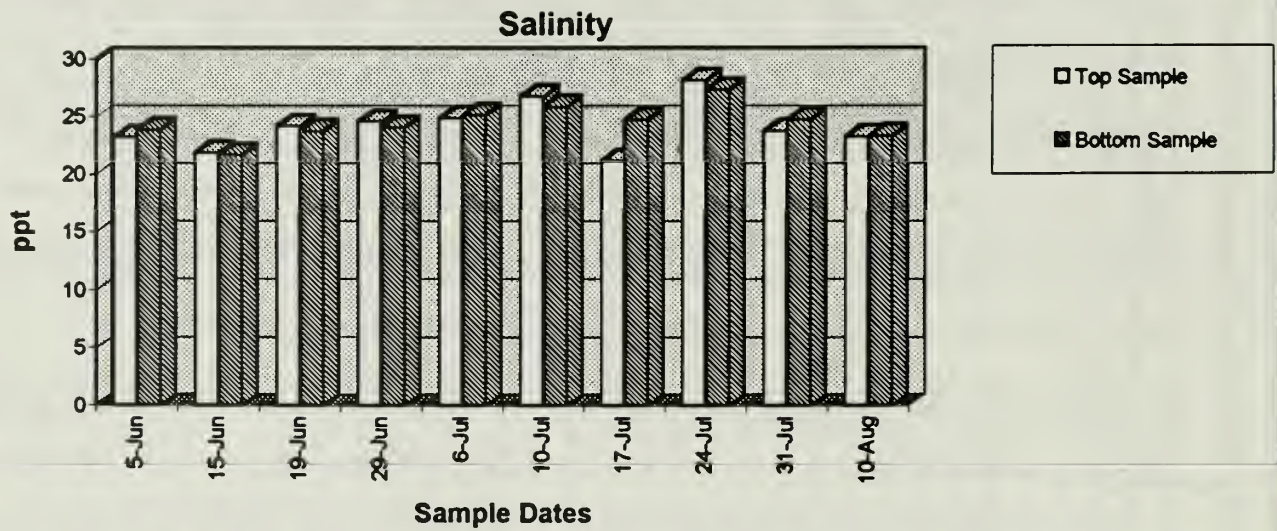
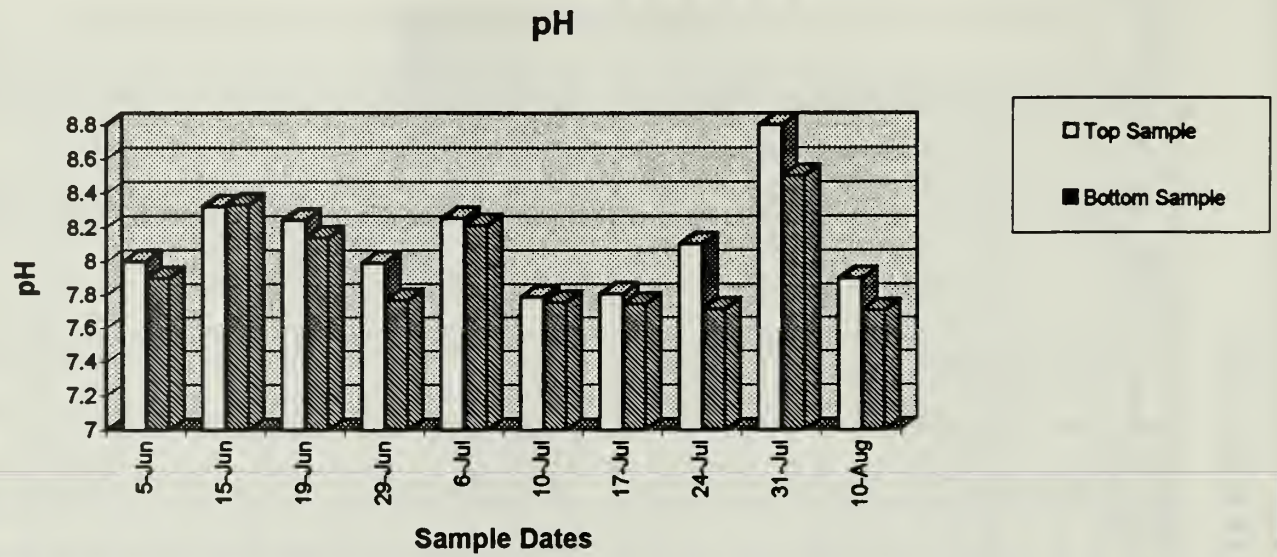
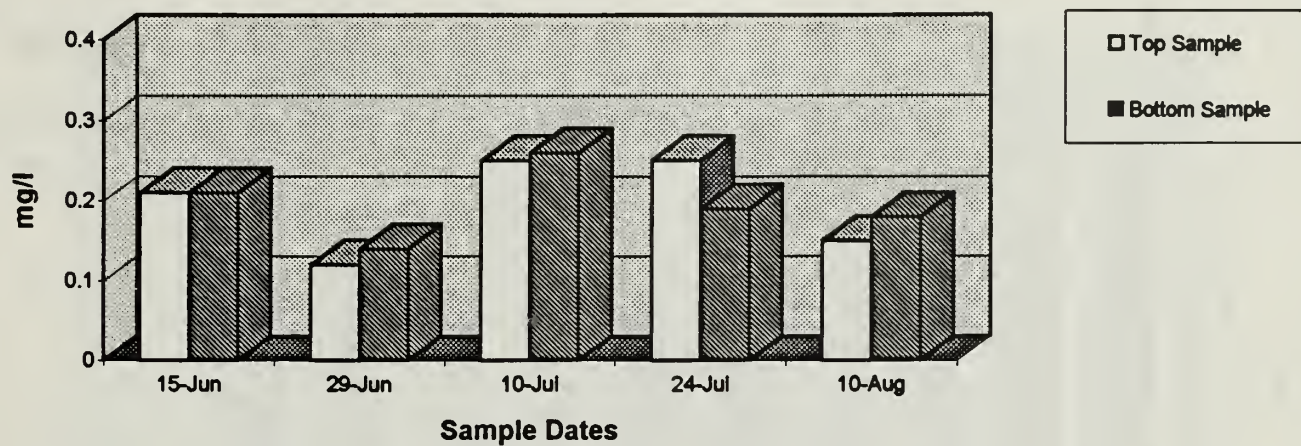


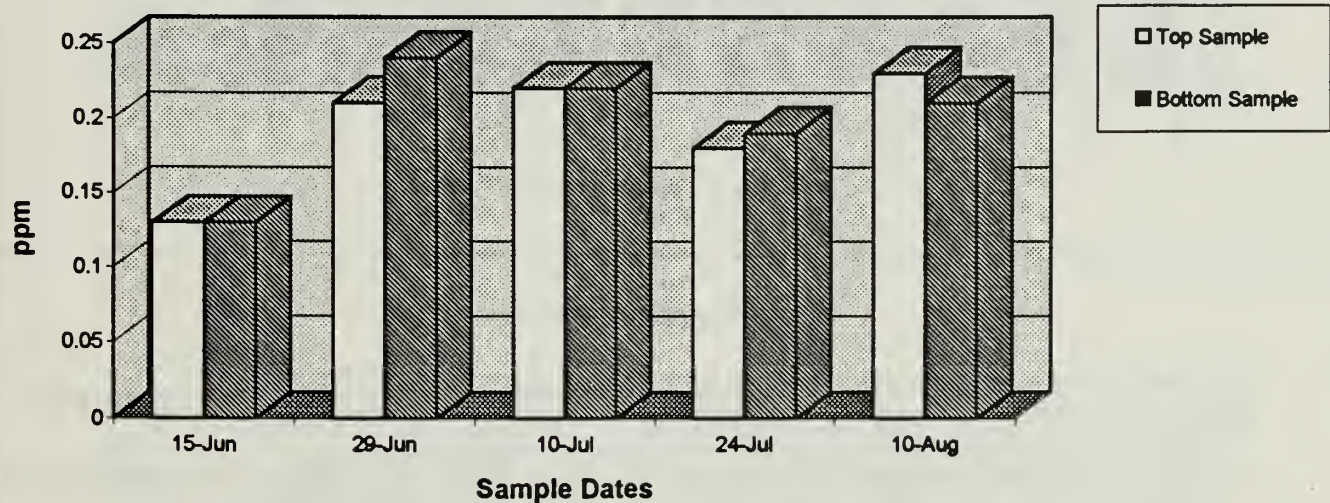
Figure 17

FK South of Runway Extension (JFKS) Water Quality Measurements, 1995

Nitrates



Phosphate (PO_4)



Chlorophyll a

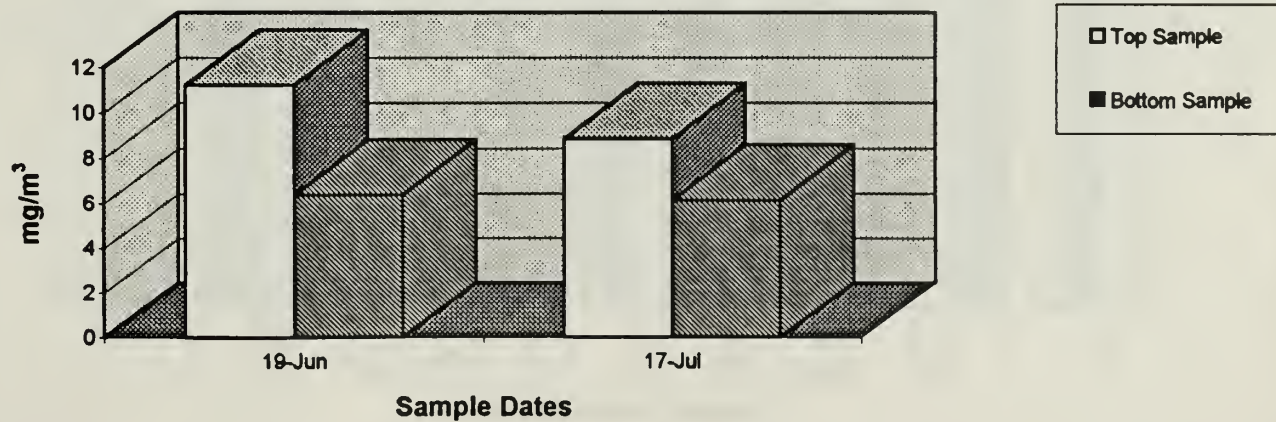


Figure 18

JFK South of Runway Extension (JFKS) Water Quality Measurements, 1995

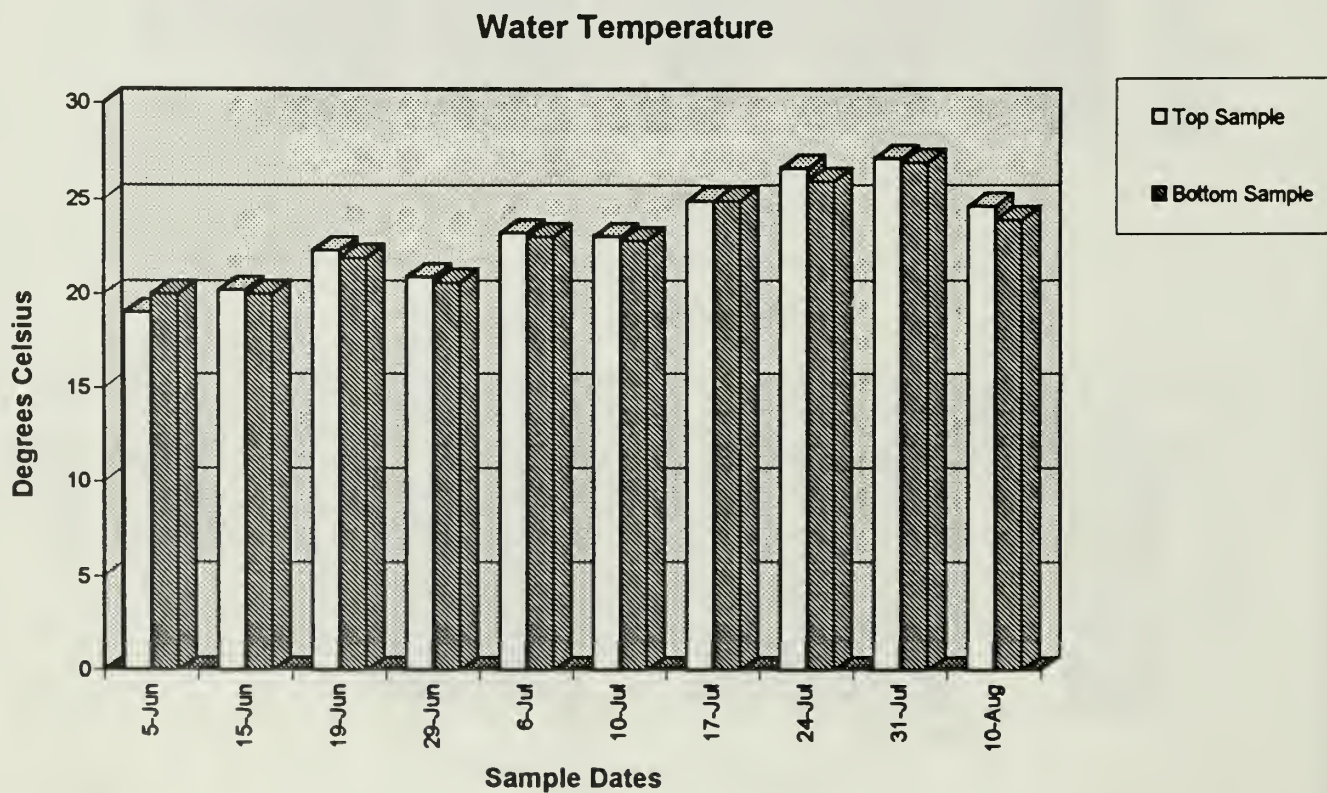
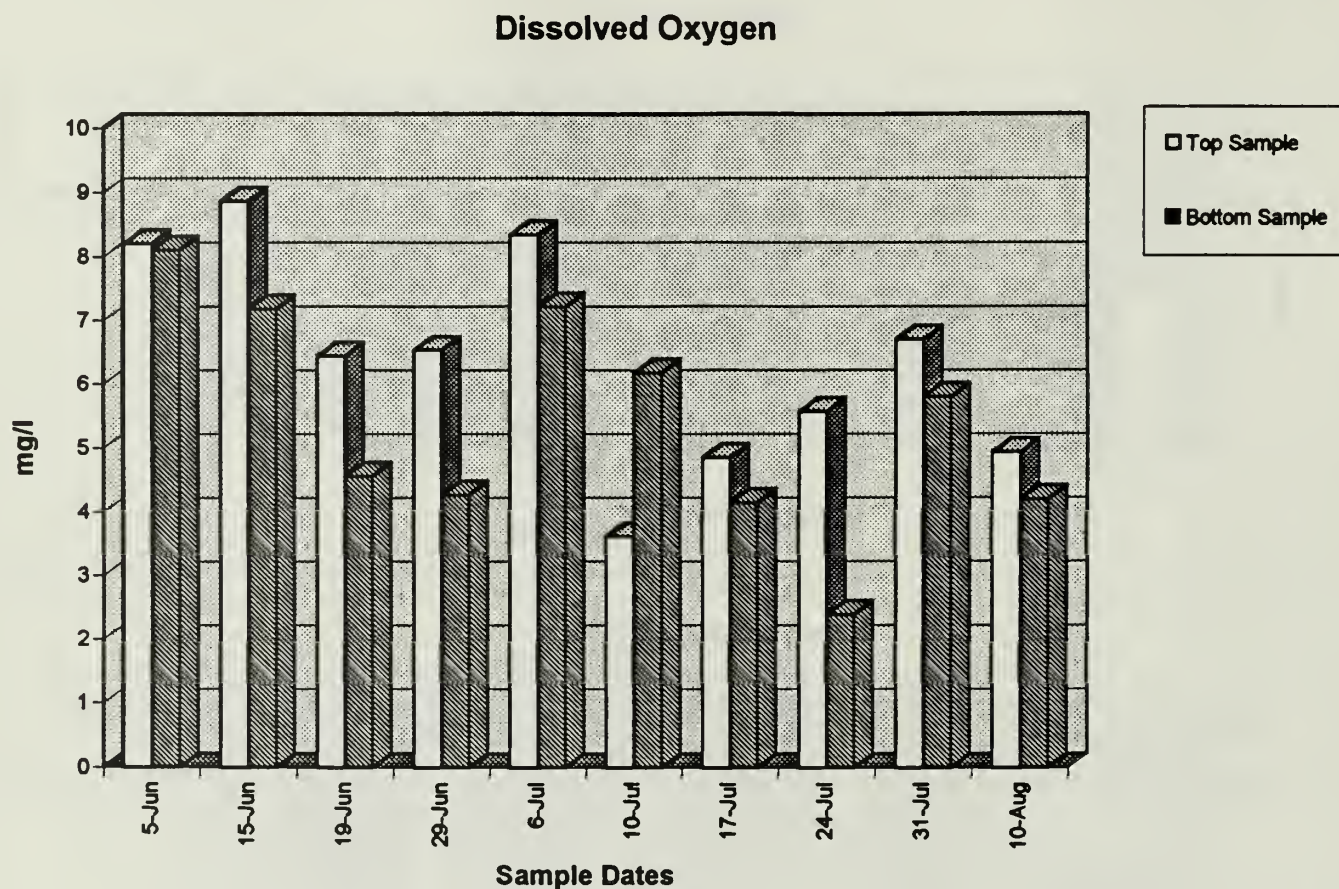
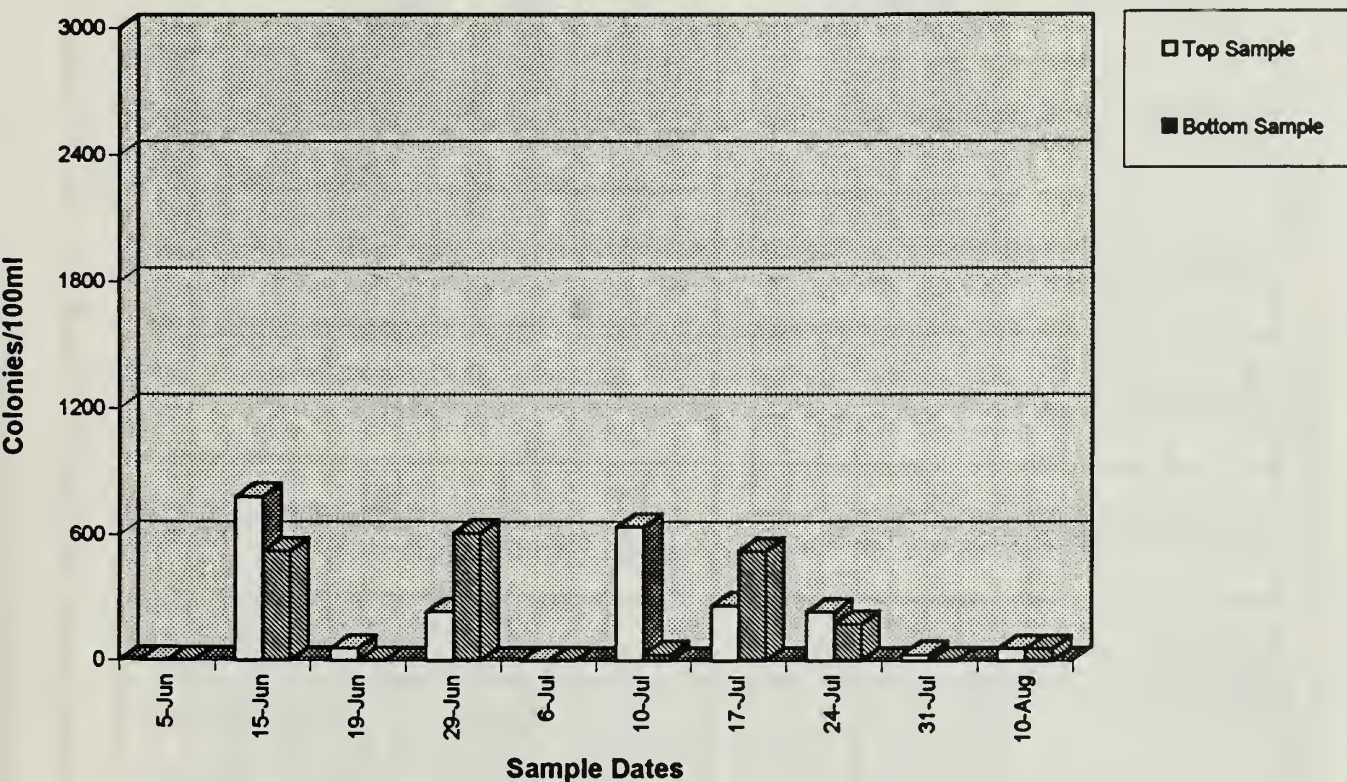


Figure 19

JFK South of Runway Extension (JFKS) Water Quality Measurements, 1995

Total Coliform Counts



Fecal Coliform Counts

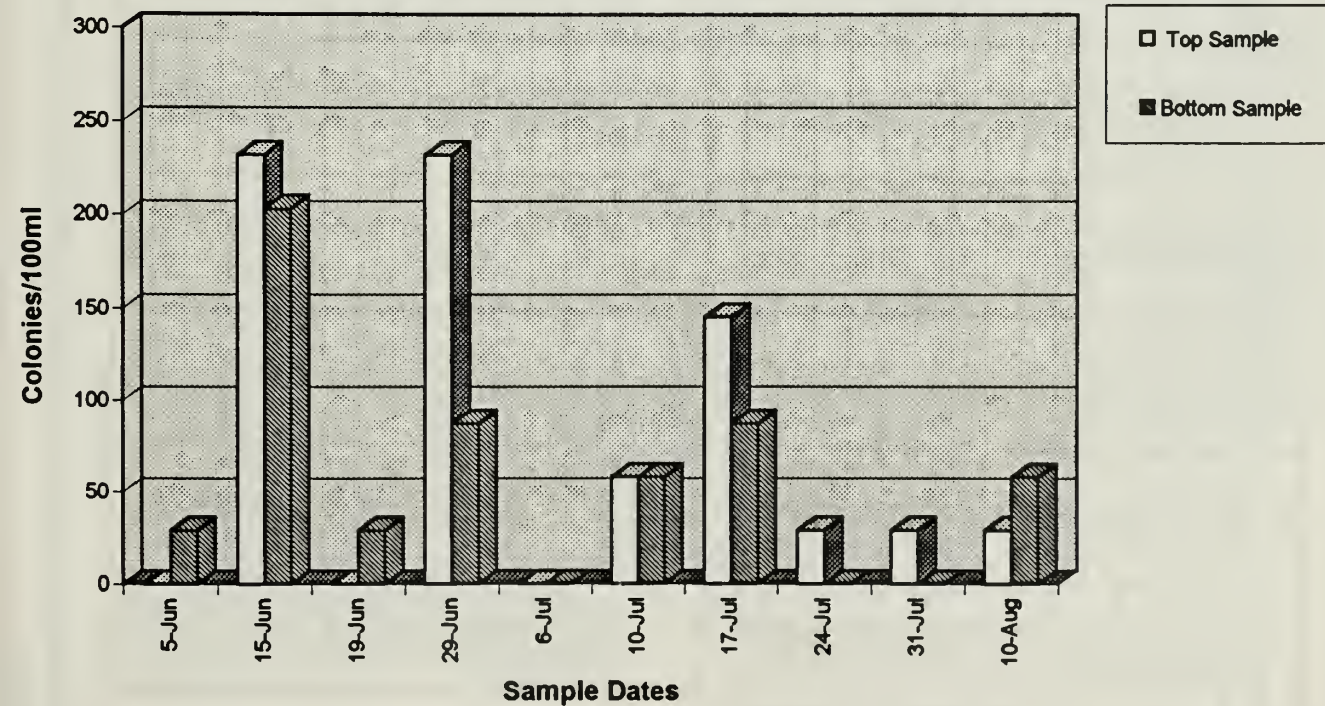


Figure 20

**Environmental Water Quality Monitoring
Jamaica Bay: JFK North of Runway Extension [JFKN], 1995**

Date	Time	Air Temp(°F)	Water Temp (°C)		pH		Salinity (ppt)		Conductivity MMHO/cm		DO (mg/l)		Nitrates (mg/l)	
			Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	0917	84	21.0	20.0	8.10	7.20	23.1	23.2	318	318	9.30	2.30	N/D	N/D
6/15/95	0845	70	20.1	20.1	8.20	7.88	21.5	22.0	312	319	7.08	4.40	0.18	0.14
6/19/95	0900	N/D	21.7	22.8	7.86	8.09	20.4	23.2	338	294	3.84	3.99	N/D	N/D
6/29/95	0855	65	20.8	20.5	7.90	7.92	24.5	24.2	340	335	5.20	4.90	<0.1	<0.1
7/06/95	0907	74	22.8	22.7	8.16	8.17	23.8	24.5	349	345	6.65	5.55	N/D	N/D
7/10/95	0858	72	22.8	22.6	8.13	7.92	24.2	25.9	328	347	8.34	8.36	0.21	<0.1
7/17/95	0855	76	24.9	24.9	7.81	7.79	24.0	23.8	371	371	4.45	3.82	N/D	N/D
7/24/95	0907	82	26.3	26.2	8.34	8.09	24.2	24.8	348	350	7.48	4.42	0.20	0.17
7/31/95	0915	80	27.1	27.0	7.00	7.40	22.6	22.8	375	380	4.60	5.30	N/D	N/D
8/10/95	0905	74	24.3	24.1	7.75	7.62	22.1	21.7	342	333	4.03	2.72	0.10	0.10
8/14/95	0945	82	26.6	N/D	8.08	N/D	24.2	N/D	382	N/D	4.12	N/D	N/D	N/D
8/21/95	1005	81	26.0	N/D	8.13	N/D	28.1	N/D	405	N/D	9.02	N/D	0.21	N/D
8/28/95	1010	78	23.6	N/D	7.80	N/D	28.9	N/D	392	N/D	8.84	N/D	N/D	N/D
9/05/95	0945	75	23.9	N/D	7.92	N/D	26.5	N/D	395	N/D	8.55	N/D	0.34	N/D

Date	Total Chlorine mg/l		Free Chlorine mg/l		Phosphate (PO ₄) ppm		Chlorophyll a mg/m ³		Total Coliform Colonies/100 ml		Fecal Coliform Colonies/100 ml	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	116	145	29	29
6/15/95	<0.05	<0.05	<0.05	<0.05	0.18	0.14	N/D	N/D	870	406	290	87
6/19/95	N/D	N/D	N/D	N/D	N/D	N/D	4.432	19.418	58	551	6206	377
6/29/95	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	N/D	N/D	145	203	87	116
7/06/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	29	58	0	0
7/10/95	<0.05	<0.05	<0.05	<0.05	0.28	0.25	N/D	N/D	2059	1189	5916	290
7/17/95	N/D	N/D	N/D	N/D	N/D	N/D	8.832	6.478	957	1131	435	754
7/24/95	<0.05	<0.05	<0.05	<0.05	0.20	0.28	N/D	N/D	1073	493	261	116
7/31/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	522	435	174	87
8/10/95	<0.05	<0.05	<0.05	<0.05	0.62	0.38	N/D	N/D	928	58	696	0
8/14/95	N/D	N/D	N/D	N/D	N/D	N/D	14.148	N/D	0	N/D	0	N/D
8/21/95	<0.05	N/D	<0.05	N/D	0.22	N/D	N/D	N/D	0	N/D	0	N/D
8/28/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	348	N/D	841	N/D
9/05/95	<0.05	N/D	<0.05	N/D	0.34	N/D	6.800	N/D	0	N/D	29	N/D

Shaded area indicates samples that exceeded total coliform counts of 2400/100ml and fecal coliform counts of 200/100ml (New York & New Jersey State bacterial standard limits).
N/D: No Data.

JFK North of Runway Extension (JFKN) Water Quality Measurements, 1995

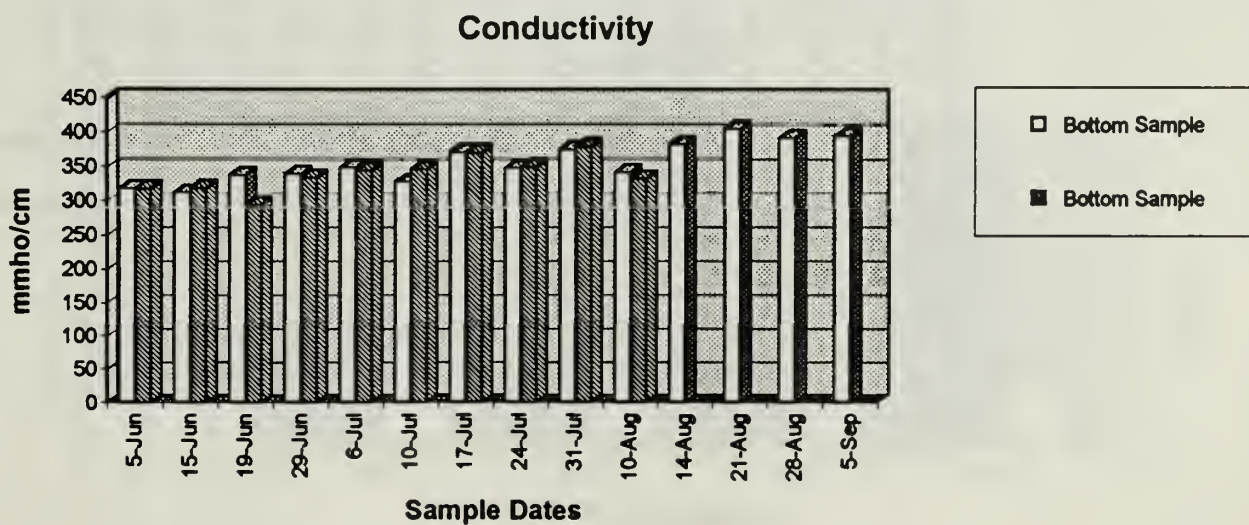
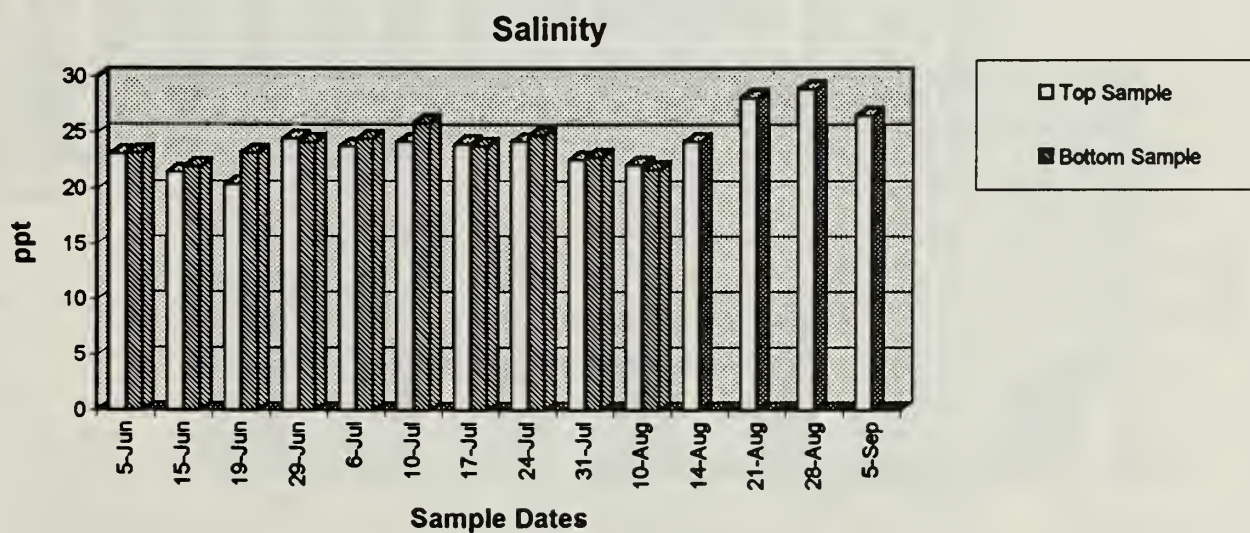
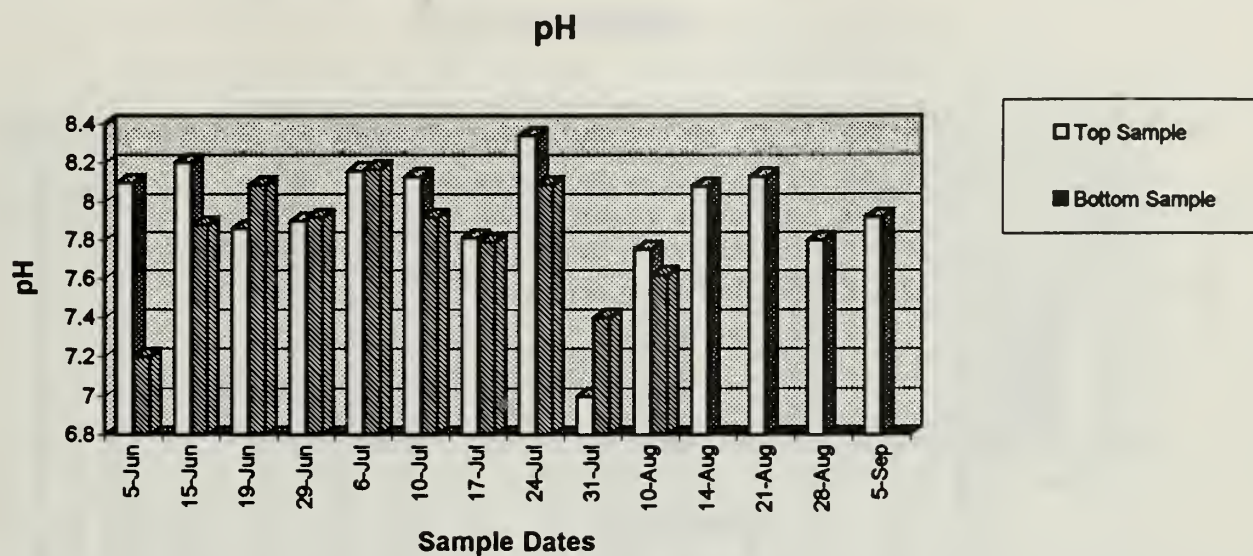
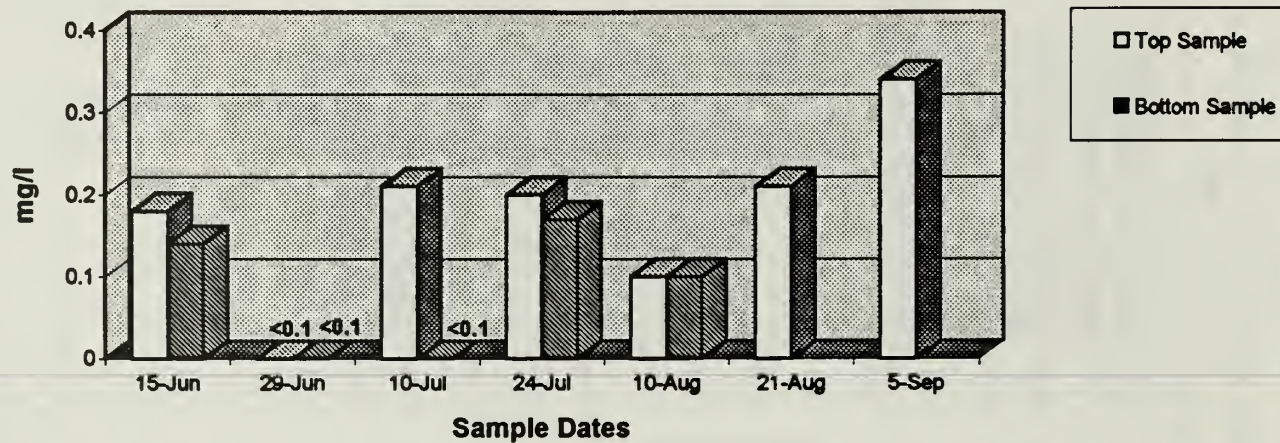


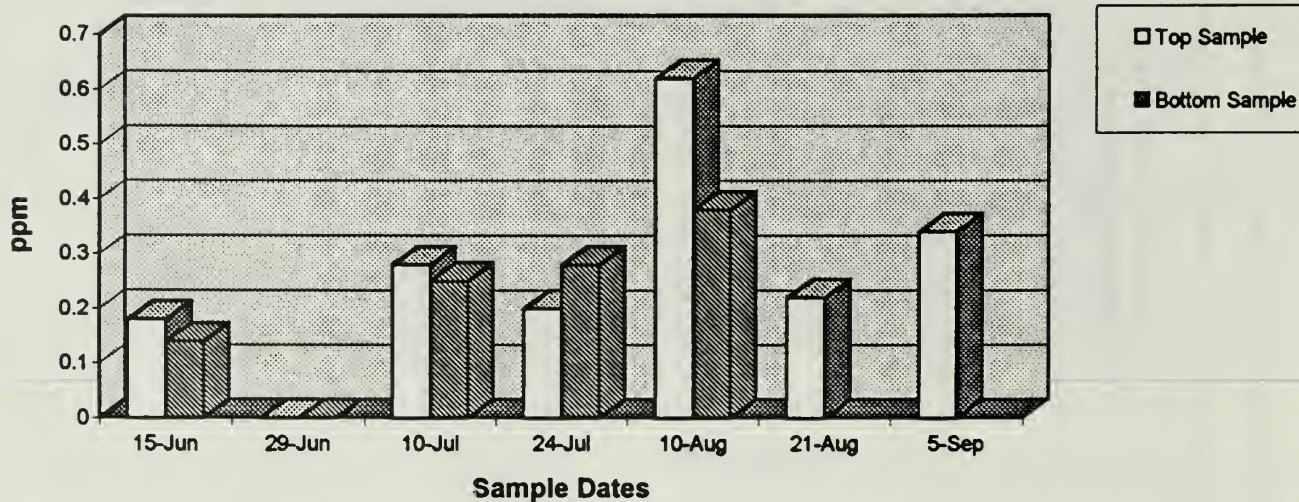
Figure 21

JFK North of Runway Extension (JFKN) Water Quality Measurements, 1995

Nitrates



Phosphate (PO_4)



Chlorophyll a

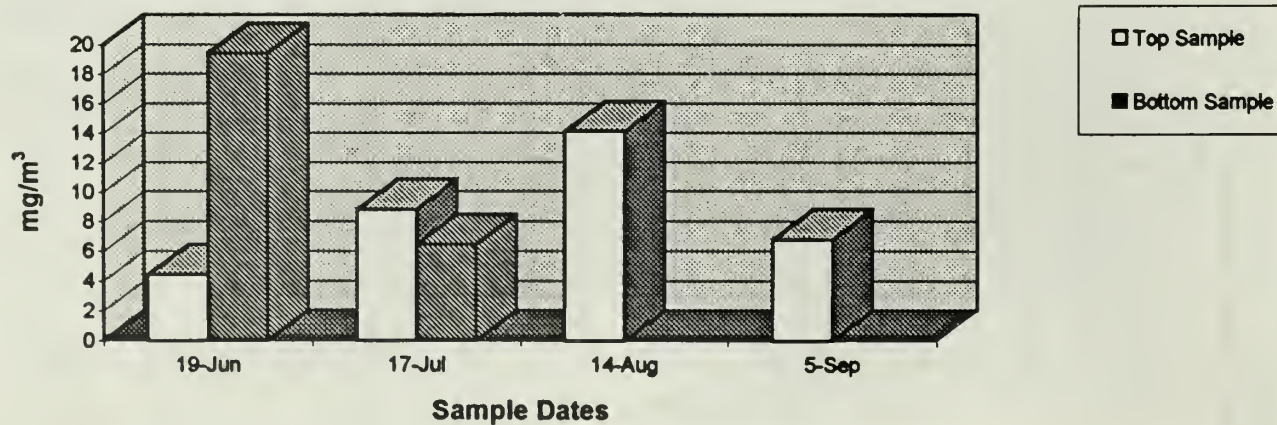
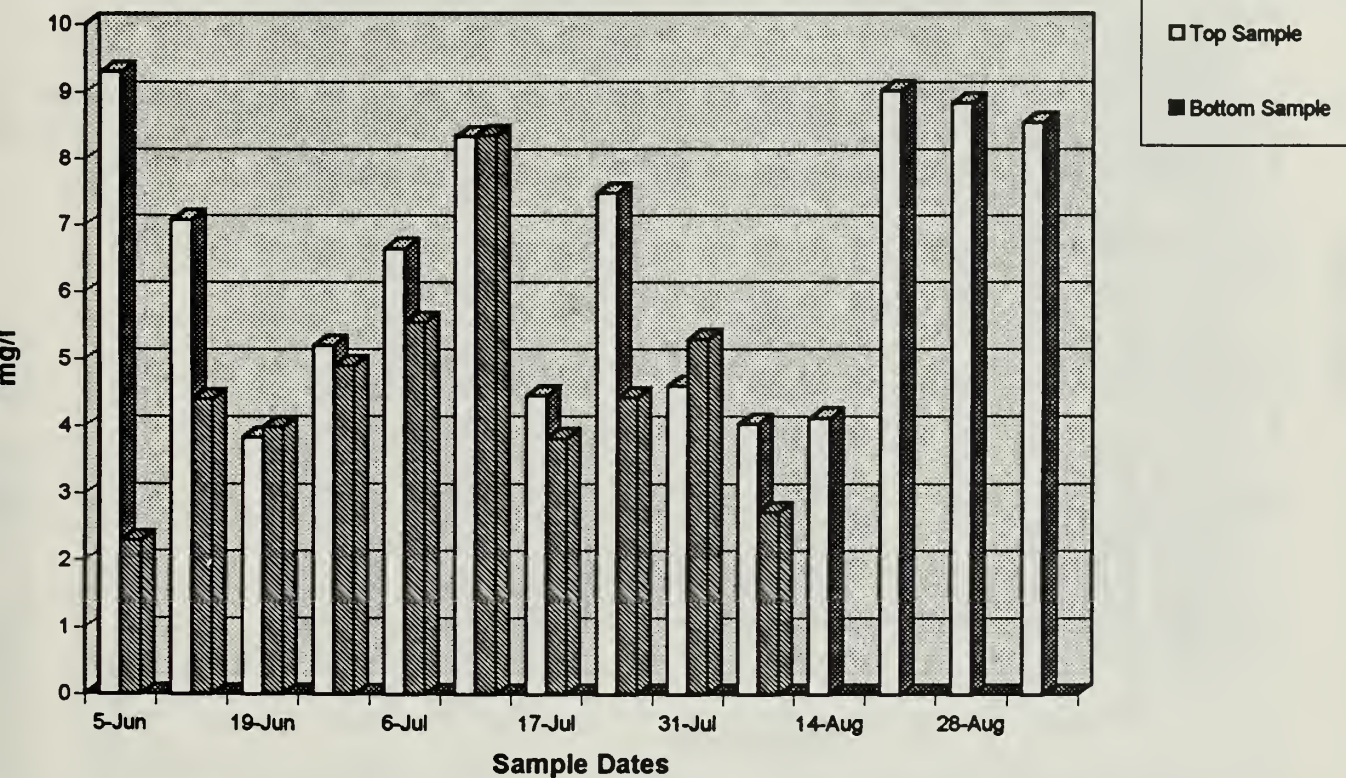


Figure 22

FK North of Runway Extension (JFKN) Water Quality Measurements, 1995

Dissolved Oxygen



Water Temperature

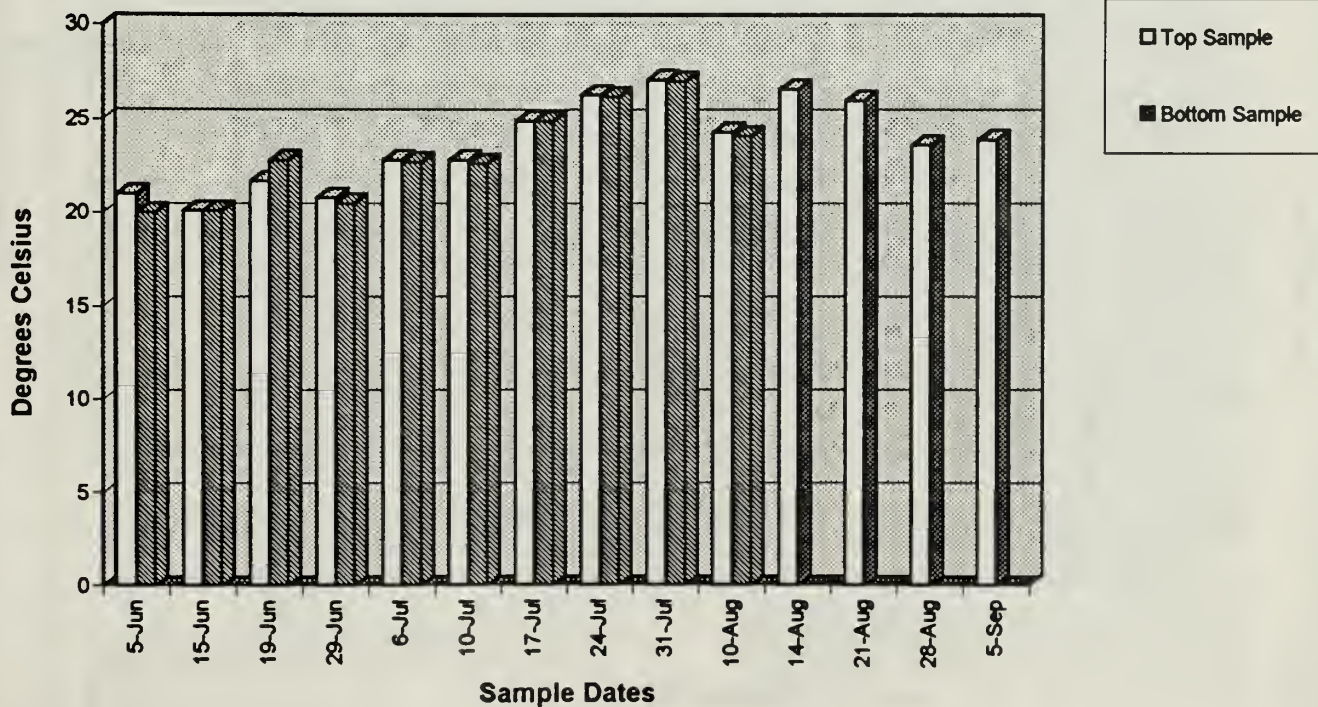
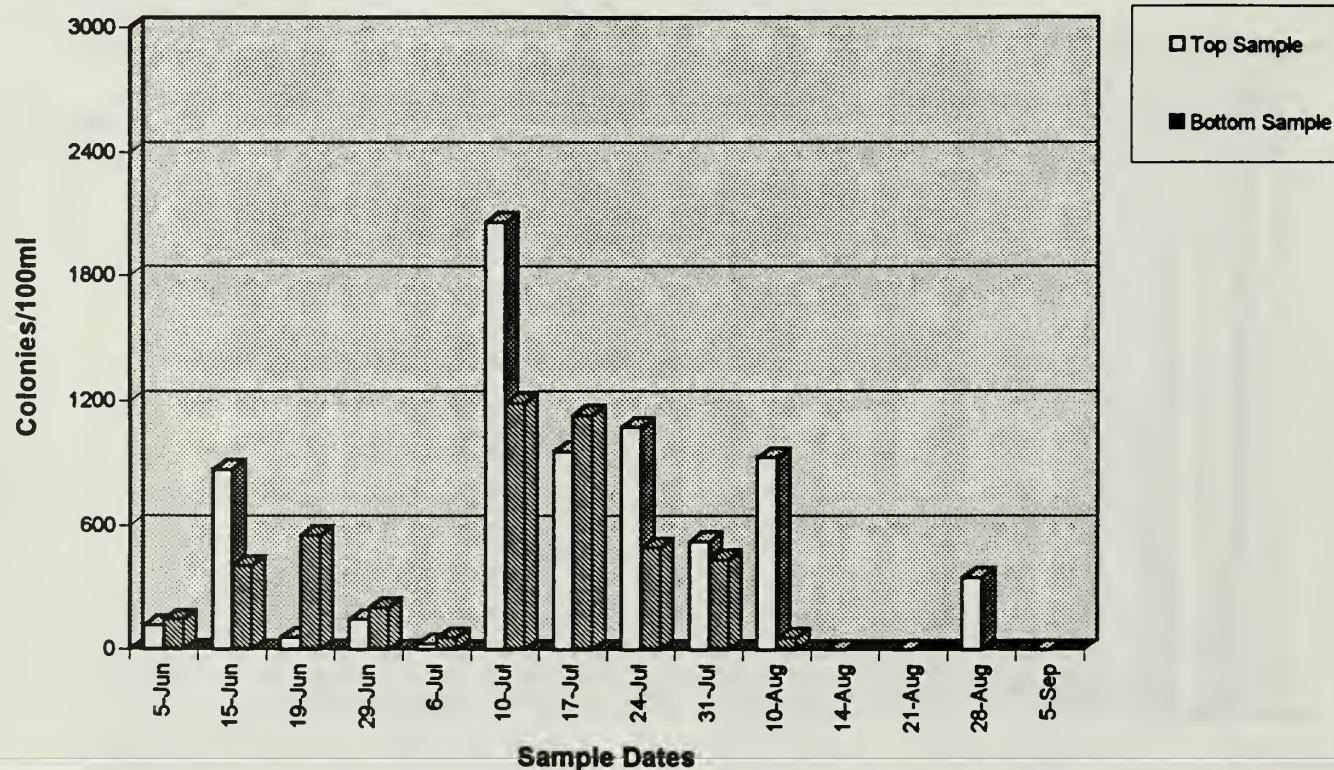


Figure 23

JFK North of Runway Extension (JFKN) Water Quality Measurements, 1995

Total Coliform Counts



Fecal Coliform Counts

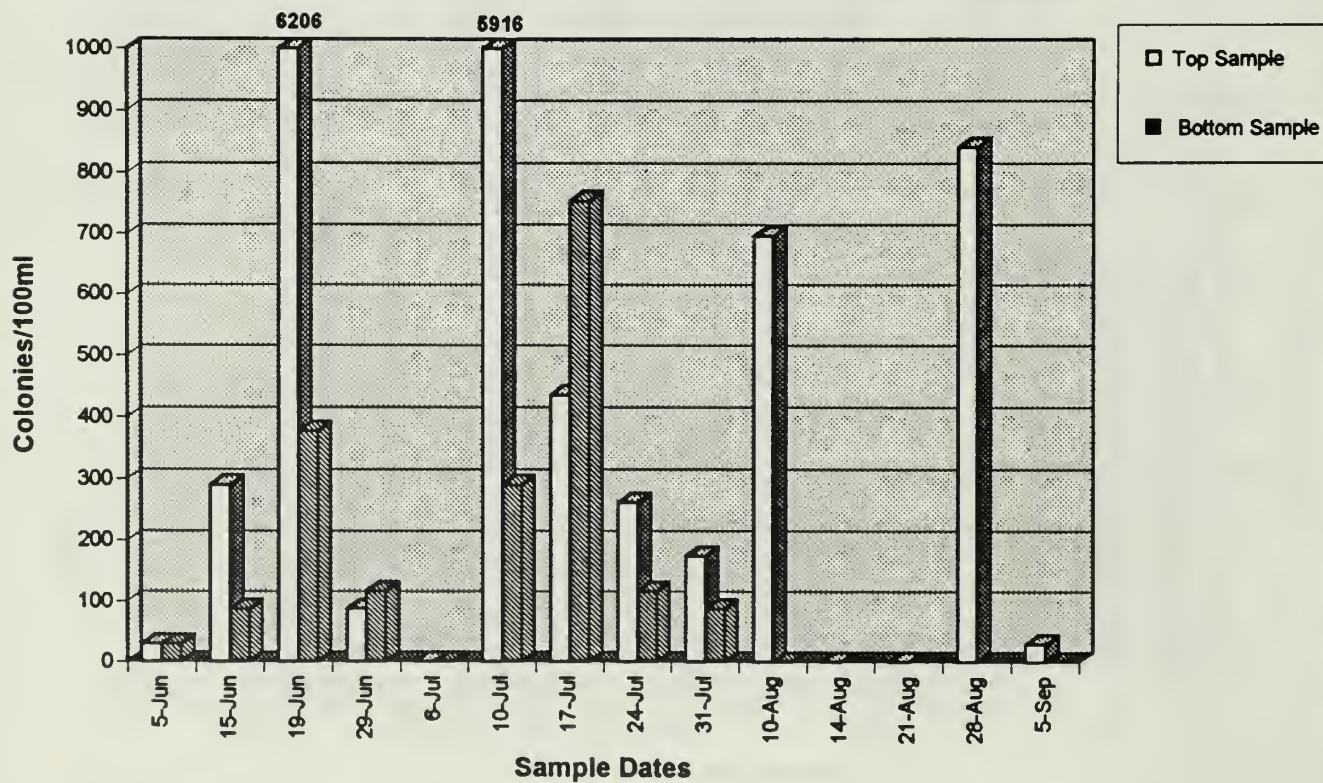


Figure 24

Jamaica Bay: Bergen Basin Outflow [JB-9], 1995

Date	Time	Air		Water Temp (°C)		pH		Salinity (ppt)		Conductivity MMHO/cm		DO		Nitrates	
		Temp(°F)		Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	0940	88		21.0	21.0	7.80	8.00	21.0	22.5	288	310	8.40	8.50	N/D	N/D
6/15/95	0835	75		20.0	19.8	8.19	8.17	23.2	23.1	252	314	3.92	4.58	0.14	0.21
6/19/95	0850	N/D		22.1	21.8	7.31	7.96	14.7	23.4	228	347	2.96	4.18	N/D	N/D
6/29/95	0842	65		20.2	20.2	7.07	7.59	10.8	23.5	157	322	1.47	3.80	<0.1	<0.1
7/06/95	0850	75		22.9	22.8	8.17	8.12	20.4	23.9	307	350	8.51	6.29	N/D	N/D
7/10/95	0850	75		22.1	22.0	7.26	7.71	18.2	25.9	248	347	8.73	8.54	<0.1	0.25
7/17/95	0845	75		24.8	25.2	7.42	7.54	20.6	23.6	325	370	3.23	2.85	N/D	N/D
7/24/95	0855	82		26.2	26.1	7.59	7.91	17.2	24.1	265	375	4.44	3.96	<0.1	0.27
7/31/95	0905	80		26.4	26.6	6.90	7.30	20.2	23.5	322	374	1.70	3.90	N/D	N/D
8/10/95	0855	75		23.4	23.7	7.29	7.59	10.9	20.9	178	341	1.57	4.24	<0.1	0.17
8/14/95	0930	82		25.5	25.5	7.77	7.81	22.3	21.7	352	349	8.27	4.12	N/D	N/D
8/21/95	0845	75		24.1	24.0	7.22	8.07	24.2	24.7	372	377	8.37	8.24	0.26	0.25
8/28/95	0830	70		22.4	22.5	6.75	7.71	24.9	25.2	377	380	8.55	8.57	N/D	N/D
9/05/95	0805	72		22.7	22.4	7.14	7.46	25.2	25.4	381	379	8.01	8.06	0.44	0.46

Date	Total Chlorine		Free Chlorine		Phosphate (PO ₄) ppm		Chlorophyll a mg/m ³		Total Coliform Colonies/100 ml		Fecal Coliform Colonies/100 ml	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	58	725	319	174
6/15/95	<0.05	<0.05	<0.05	<0.05	0.17	N/D	N/D	N/D	0	1363	TNTC	551
6/19/95	N/D	N/D	N/D	N/D	N/D	N/D	6.400	44.926	0	1421	9019	609
6/29/95	<0.05	<0.05	<0.05	<0.05	0.24	N/D	N/D	N/D	0	1015	1566	1189
7/06/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	1827	725	927	203
7/10/95	<0.05	<0.05	<0.05	<0.05	0.22	N/D	N/D	N/D	29	2755	7395	957
7/17/95	N/D	N/D	N/D	N/D	N/D	N/D	4.416	2.062	0	2233	9193	2465
7/24/95	<0.05	<0.05	<0.05	<0.05	0.23	N/D	N/D	N/D	0	3422	TNTC	1682
7/31/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0	1421	1421	1479
8/10/95	<0.05	<0.05	<0.05	<0.05	0.13	N/D	N/D	N/D	0	10179	2001	1827
8/14/95	N/D	N/D	N/D	N/D	N/D	N/D	7.670	9.408	116	232	261	116
8/21/95	<0.05	<0.05	<0.05	<0.05	0.18	N/D	N/D	N/D	116	0	203	0
8/28/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	609	319	377	87
9/05/95	<0.05	<0.05	<0.05	<0.05	0.31	0	0	0	58	29	87	29

N/D: No Data.

TNTC: Too Numerous To Count.

Shaded area indicates samples that exceeded total coliform counts of 2400/100ml and fecal coliform counts of 200/100ml (New York & New Jersey State bacterial standard limits).

Bergen Basin Outflow (JB-9) Water Quality Measurements, 1995

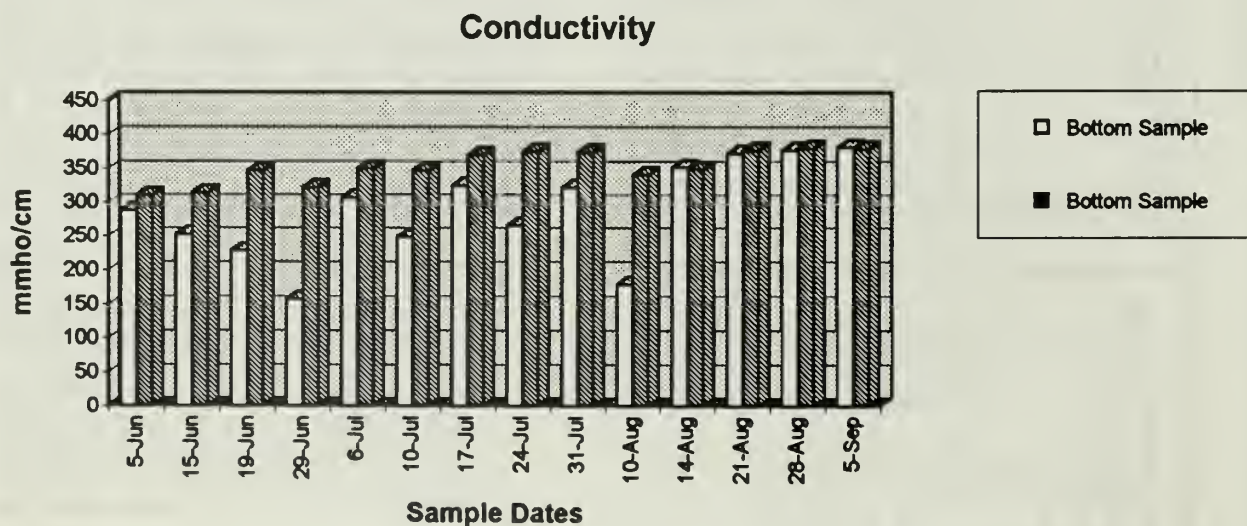
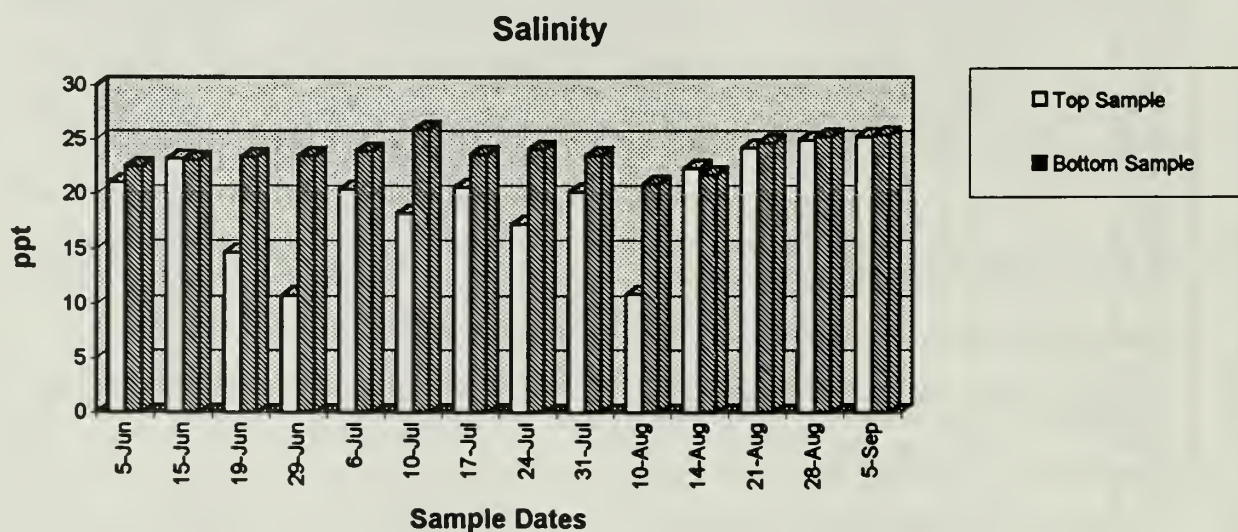
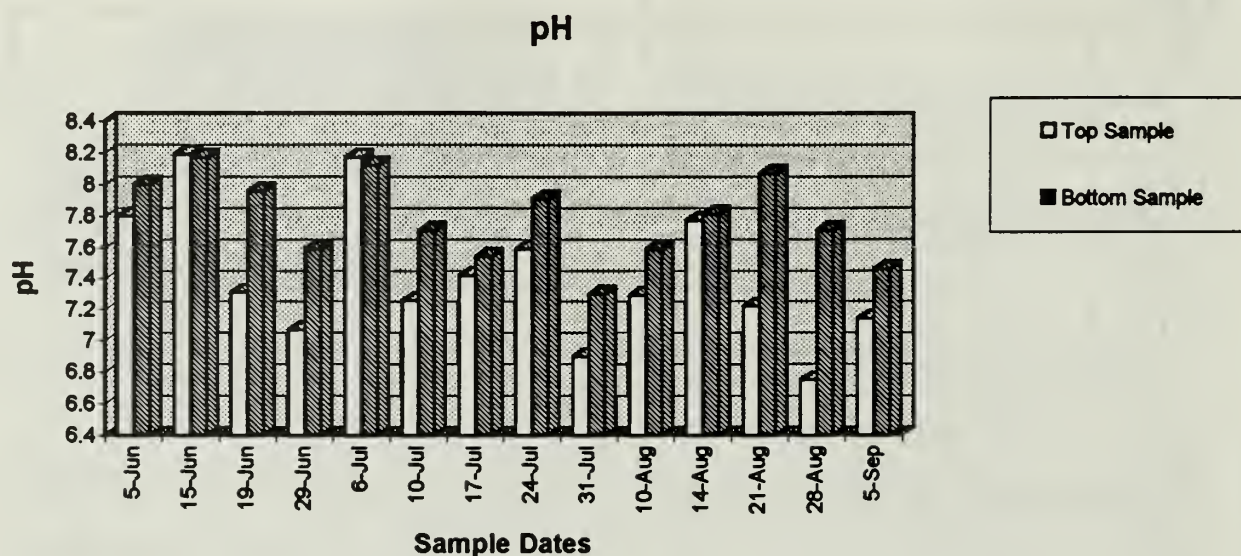
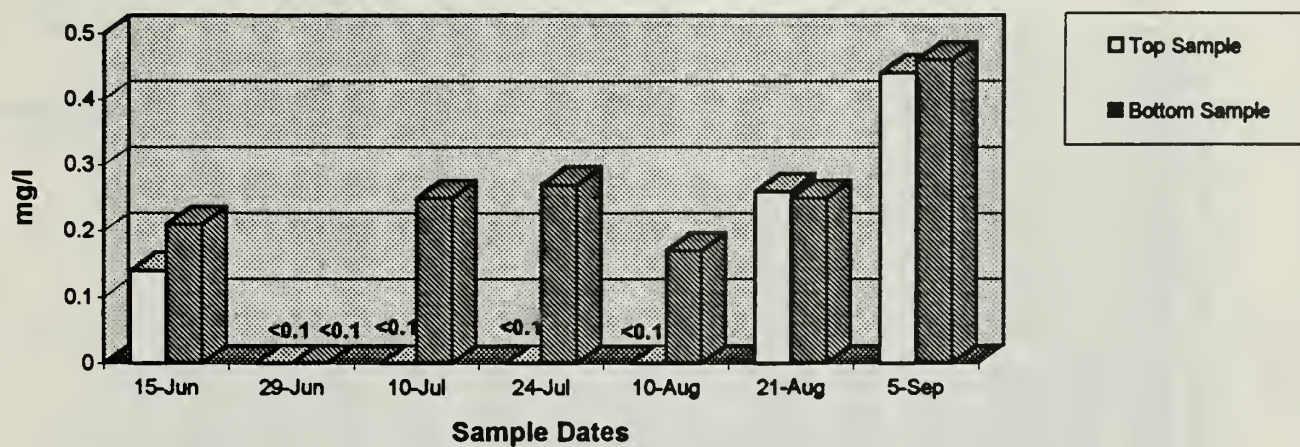


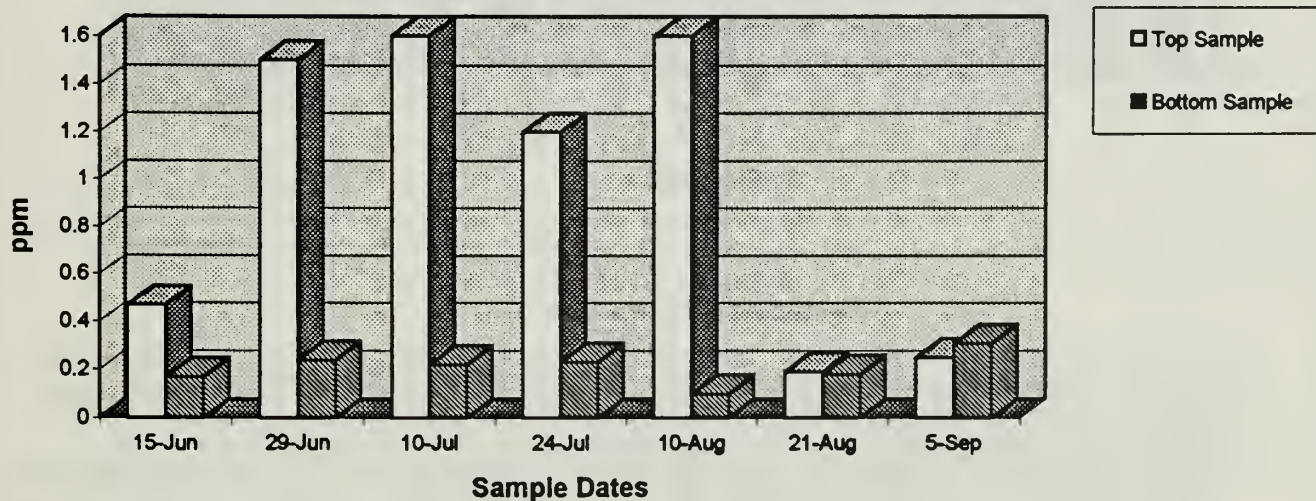
Figure 25

Bergen Basin Outflow (JB-9) Water Quality Measurements, 1995

Nitrates



Phosphate (PO₄)



Chlorophyll a

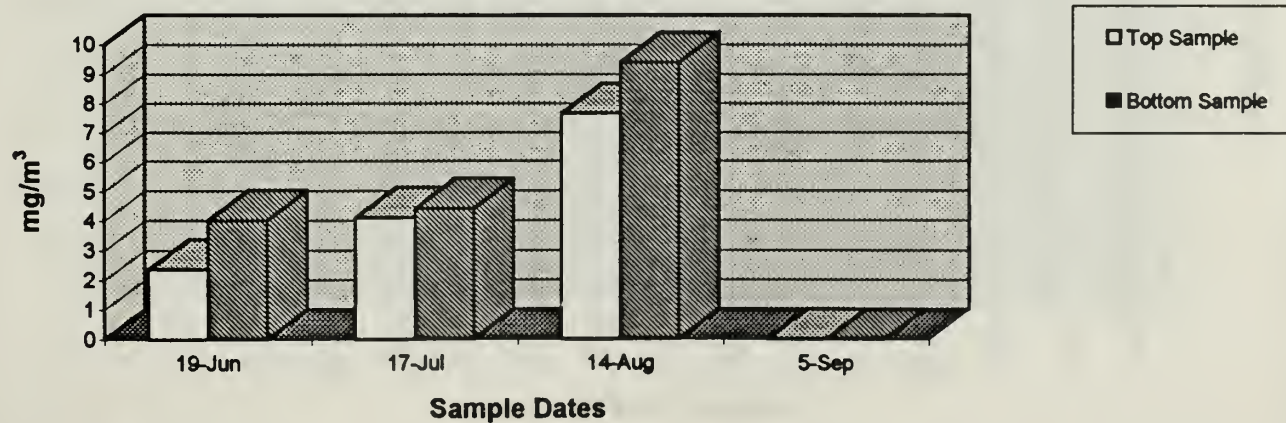
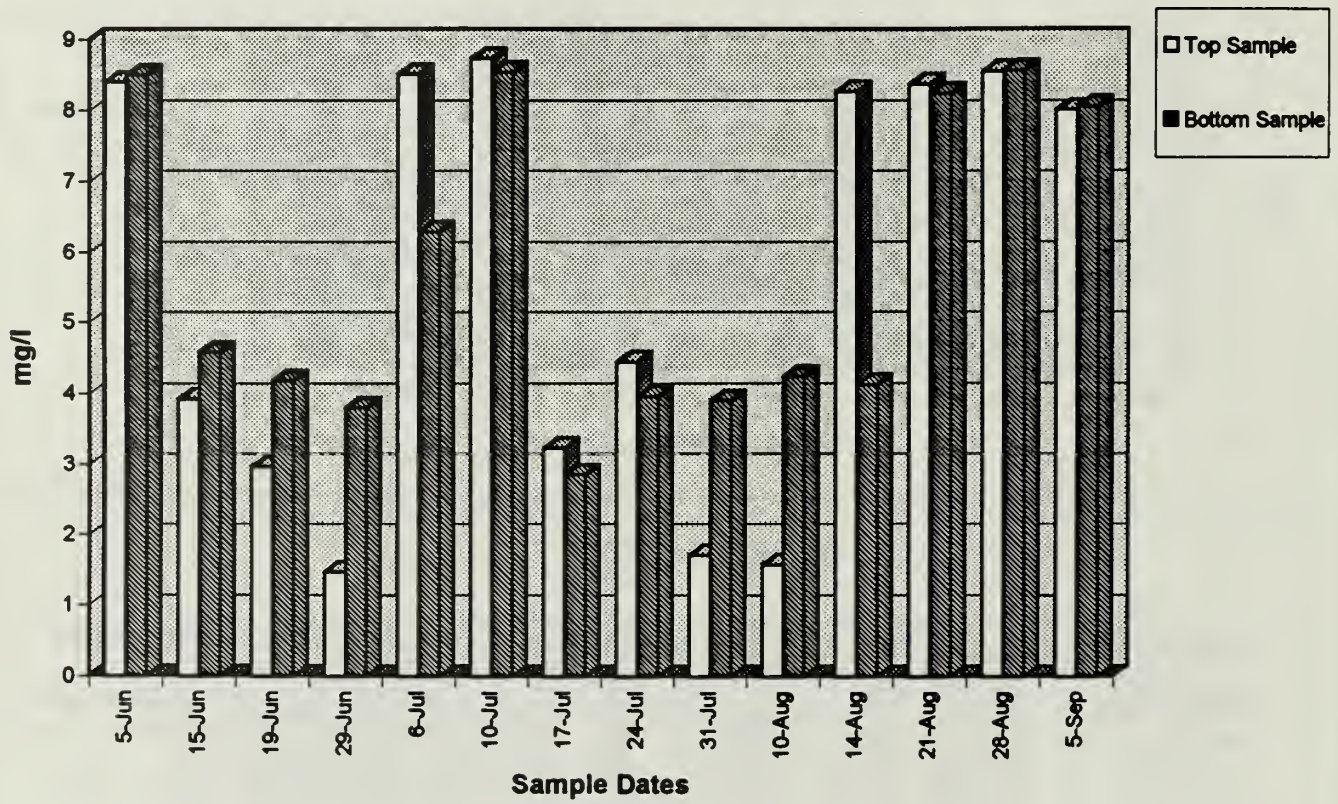


Figure 26

Bergen Basin Outflow (JB-9) Water Quality Measurements, 1995

Dissolved Oxygen



Water Temperature

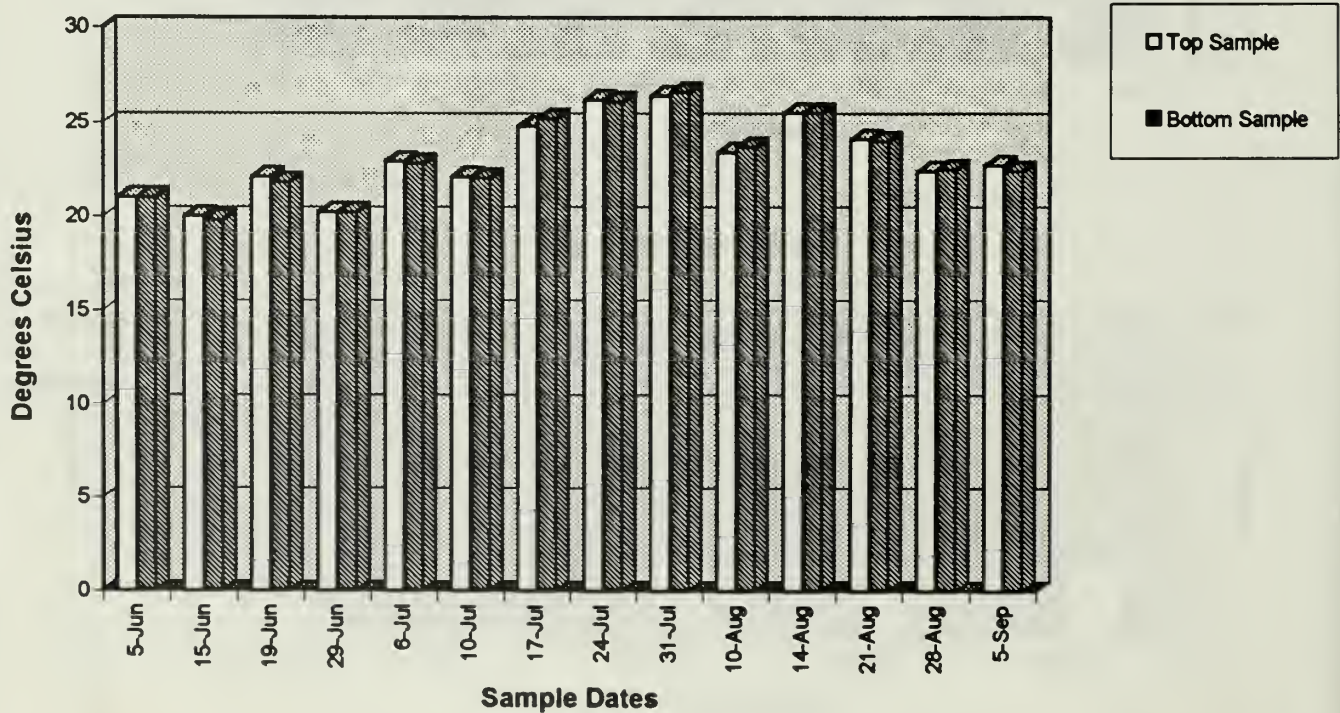
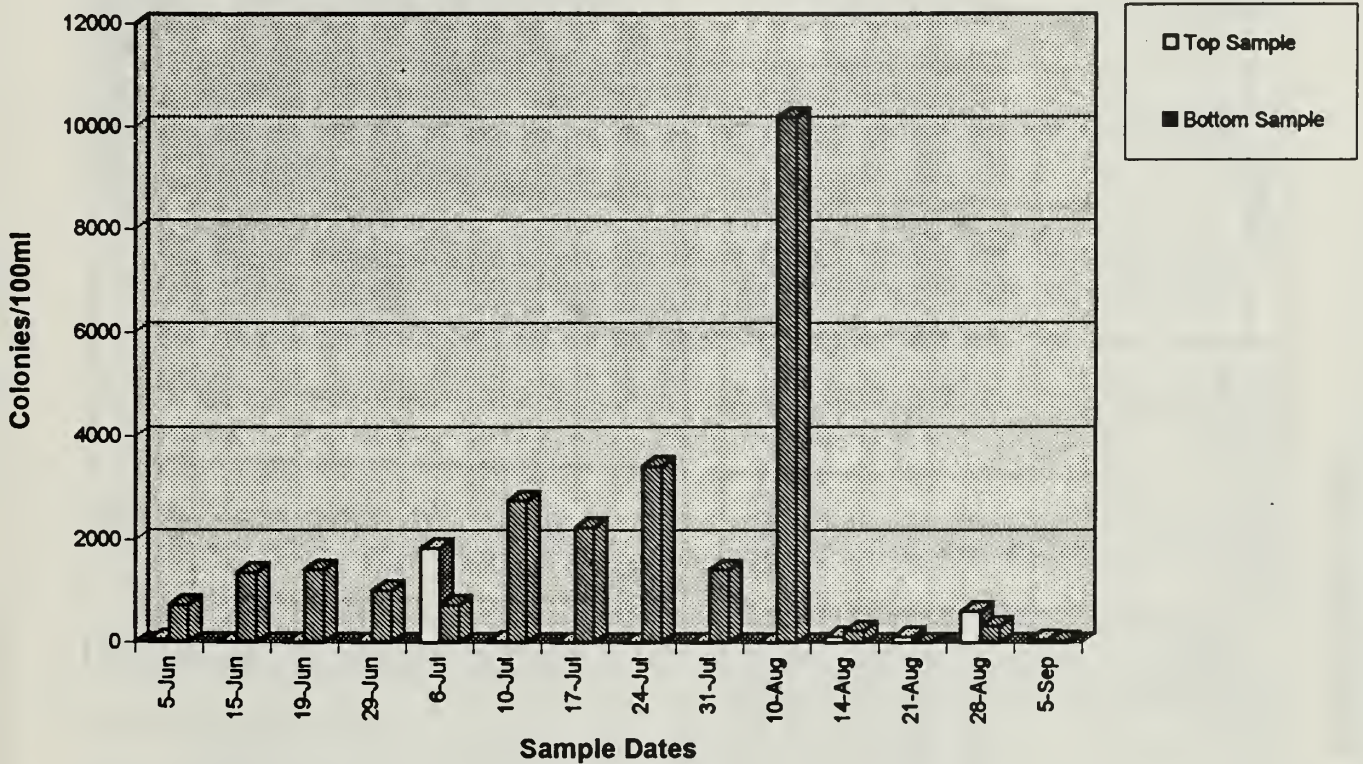


Figure 27

Bergen Basin Outflow (JB-9) Water Quality Measurements, 1995

Total Coliform Counts



Fecal Coliform Counts

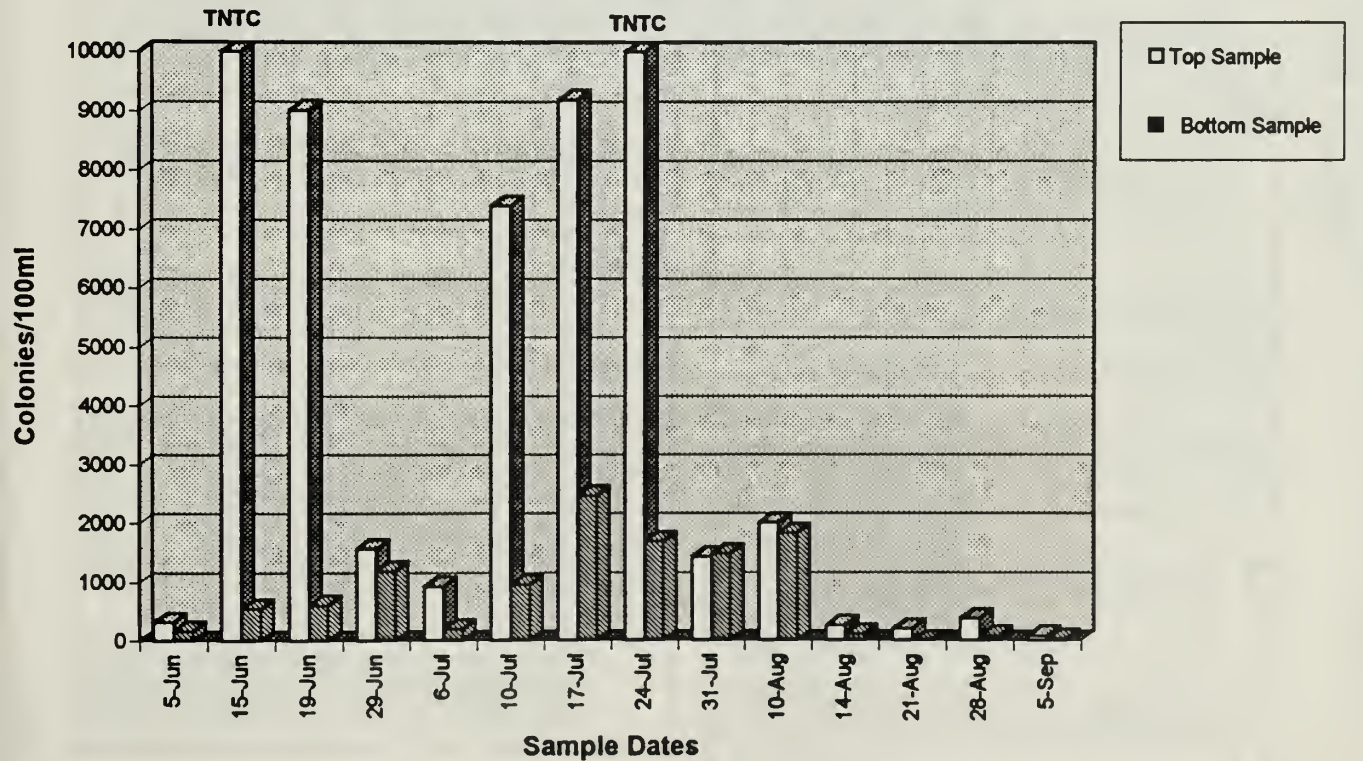


Figure 28

Table XI
Environmental Water Quality Monitoring
Jamaica Bay: Bergen Basin [BB], 1995

Date	Time	Air Temp(°F)	Water Temp (°C)		pH		Salinity (ppt)		Conductivity MMHO/cm		DO (mg/l)		Nitrates (mg/l)	
			Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	0930	85	21.0	21.0	7.20	7.80	10.1	21.1	143	290	7.40	7.90	N/D	N/D
6/15/95	0830	70	19.8	19.8	7.12	8.00	12.5	21.4	185	300	1.80	5.80	<0.1	<0.1
6/19/95	0840	N/D	22.1	22.1	7.05	7.86	7.2	22.5	124	337	1.89	3.36	N/D	N/D
6/29/95	0835	63	20.4	20.3	7.09	7.66	13.2	20.2	183	283	1.10	3.91	<0.1	0.12
7/06/95	0840	74	22.4	22.3	7.12	7.67	10.3	22.6	156	331	8.11	3.96	N/D	N/D
7/10/95	0835	70	20.7	22.6	7.16	7.51	8.6	25.2	122	337	3.96	2.42	<0.1	<0.1
7/17/95	0830	75	23.9	24.8	6.96	7.29	9.3	23.8	150	359	0.85	1.56	N/D	N/D
7/24/95	0850	82	25.7	26.1	7.44	7.88	14.8	23.3	285	362	3.66	3.41	0.10	0.16
7/31/95	0855	80	26.5	26.8	7.30	7.70	18.6	22.5	308	368	1.00	3.70	N/D	N/D
8/10/95	0845	73	22.6	23.1	7.30	7.53	8.6	24.1	127	349	2.02	2.95	<0.1	0.12
8/14/95	1030	85	26.7	26.4	7.80	7.77	24.9	24.1	385	375	8.53	4.80	N/D	N/D
8/21/95	0950	81	25.3	25.2	7.86	7.85	28.5	28.6	396	401	9.04	9.25	0.24	0.33
8/28/95	0950	75	23.2	22.9	7.78	7.77	25.2	24.9	388	382	9.00	8.78	N/D	N/D
9/05/95	0915	75	23.2	23.0	7.64	7.57	24.9	24.2	379	334	8.48	8.34	0.41	0.40

Date	Total Chlorine mg/l		Free Chlorine mg/l		Phosphate (PO ₄) ppm		Chlorophyll a mg/m ³		Total Coliform Colonies/100 ml		Fecal Coliform Colonies/100 ml	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0	87	638	1769
6/15/95	<0.05	<0.05	<0.05	<0.05	0.65	0.19	N/D	N/D	87	1421	0	493
6/19/95	N/D	N/D	N/D	N/D	N/D	N/D	0.192	4.030	0	957	4901	1856
6/29/95	<0.05	<0.05	<0.05	<0.05	1.30	0.27	N/D	N/D	0	783	4379	899
7/06/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	58	1421	8294	261
7/10/95	<0.05	<0.05	<0.05	<0.05	2.50	0.60	N/D	N/D	0	3248	TNTC	1189
7/17/95	N/D	N/D	N/D	N/D	N/D	N/D	2.062	2.046	0	1798	0	1508
7/24/95	<0.05	<0.05	<0.05	<0.05	1.20	0.65	N/D	N/D	0	0	14384	7685
7/31/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0	1305	1566	1682
8/10/95	<0.05	<0.05	<0.05	<0.05	3.60	0.25	N/D	N/D	0	2610	TNTC	754
8/14/95	N/D	N/D	N/D	N/D	N/D	N/D	7.670	9.732	464	319	203	174
8/21/95	<0.05	<0.05	<0.05	<0.05	0.26	0.27	N/D	N/D	377	1102	29	203
8/28/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	1189	725	87	261
9/05/95	<0.05	<0.05	<0.05	<0.05	0.29	0.30	8.900	4.700	2349	841	1421	377

N/D: No Data.

TNTC: Too Numerous To Count.

Bergen Basin (BB) Water Quality Measurements, 1995

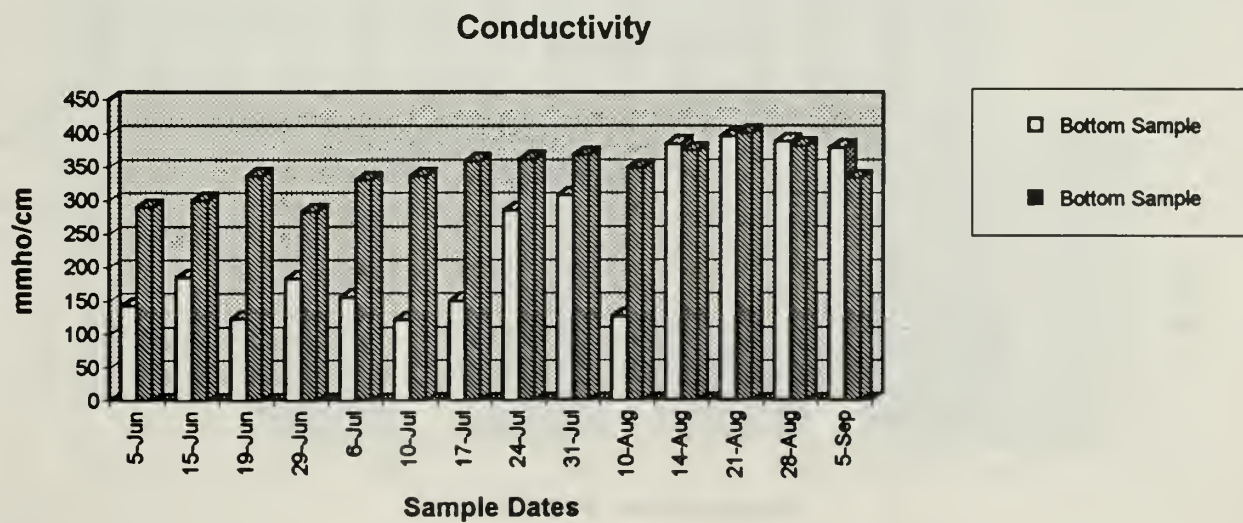
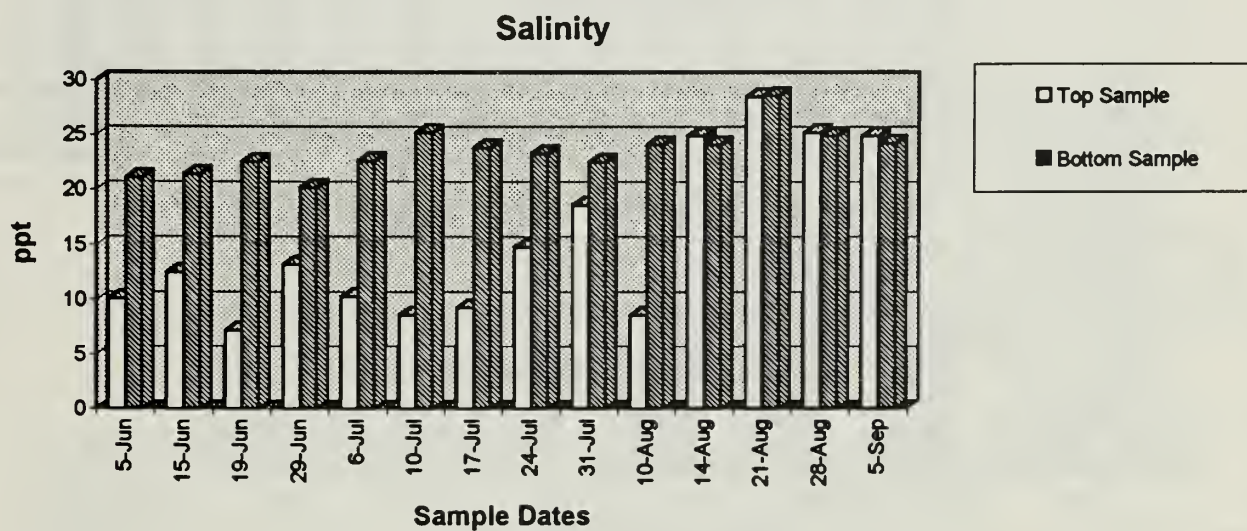
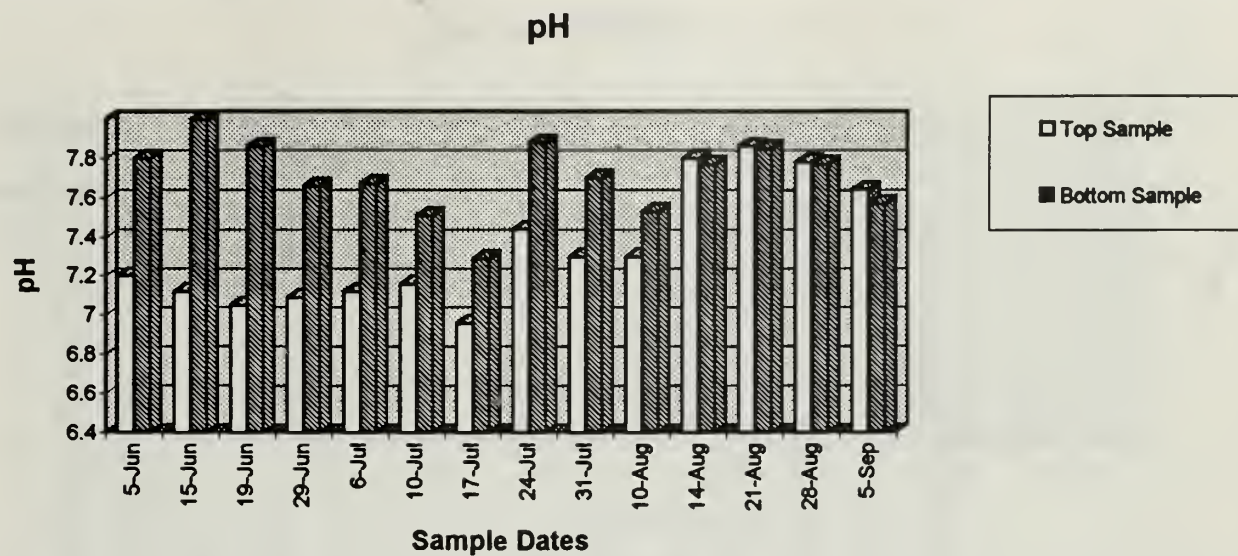
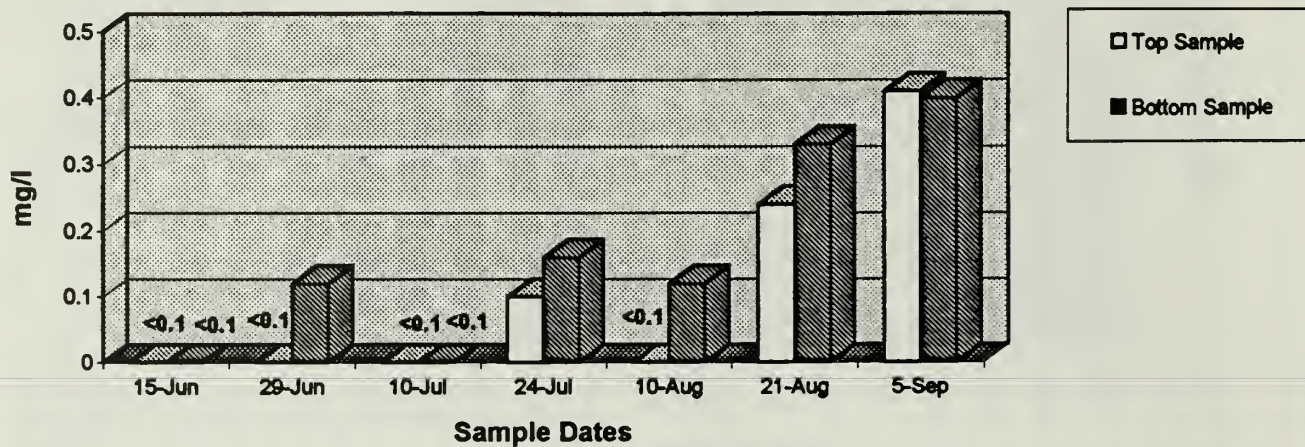


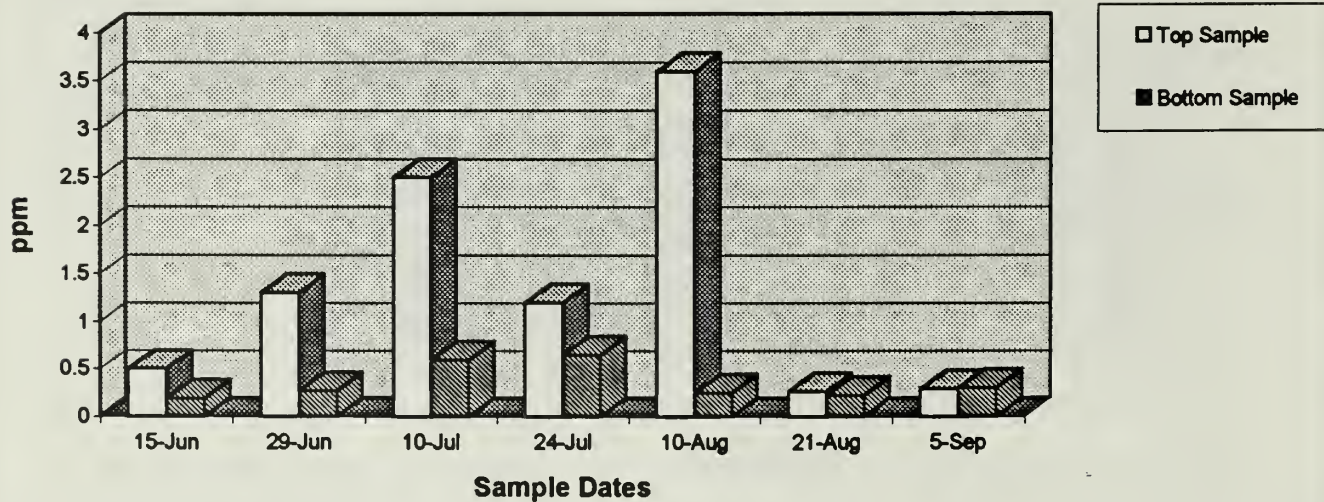
Figure 29

Bergen Basin (BB) Water Quality Measurements, 1995

Nitrates



Phosphate (PO₄)



Chlorophyll a

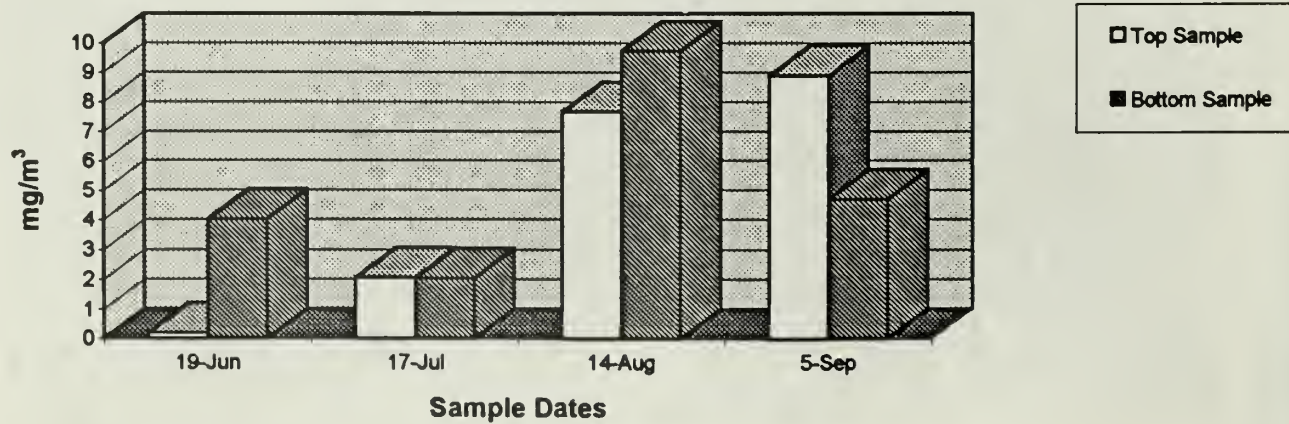
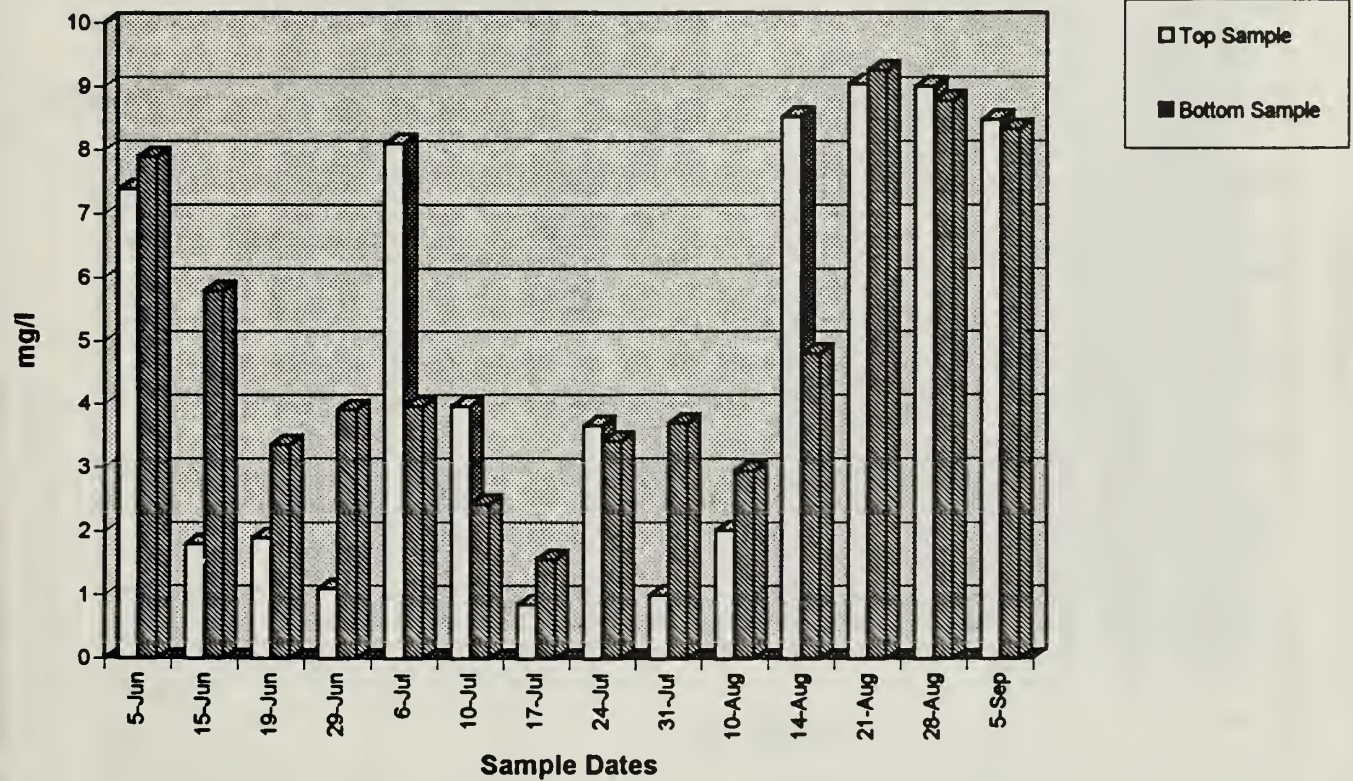


Figure 30

Bergen Basin (BB) Water Quality Measurements, 1995

Dissolved Oxygen



Water Temperature

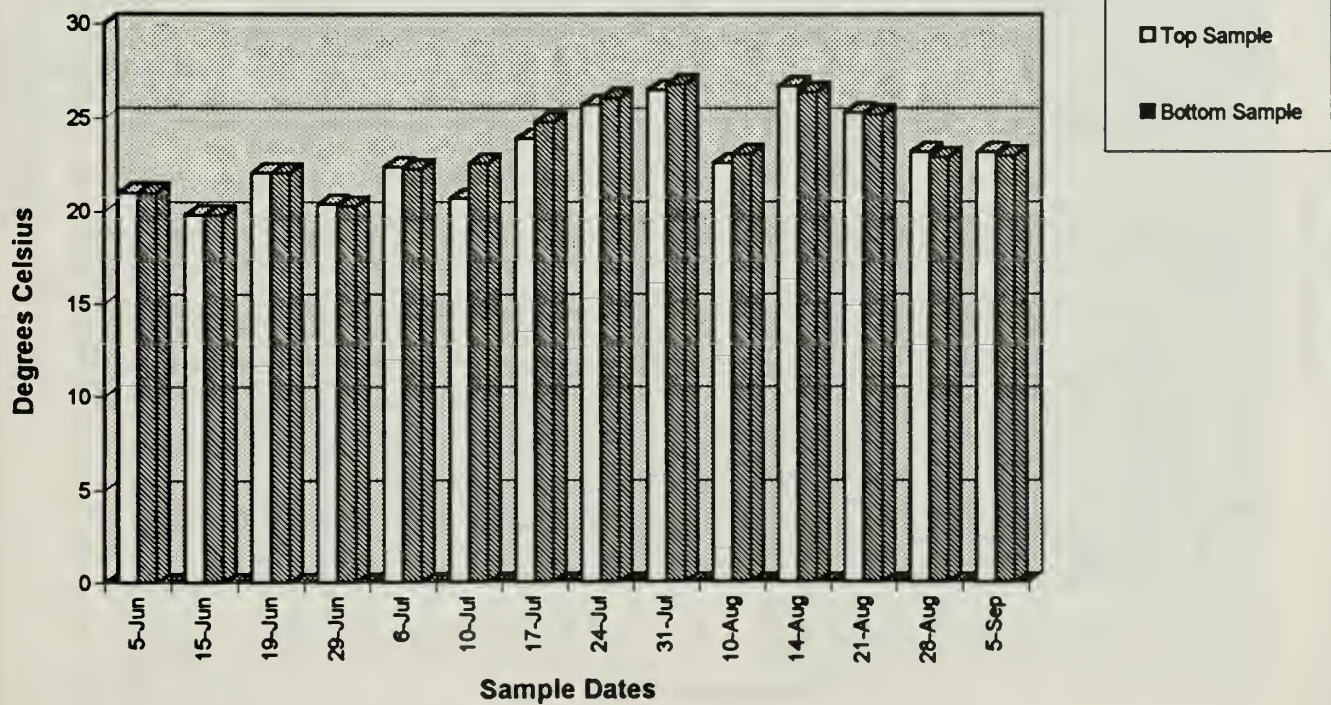
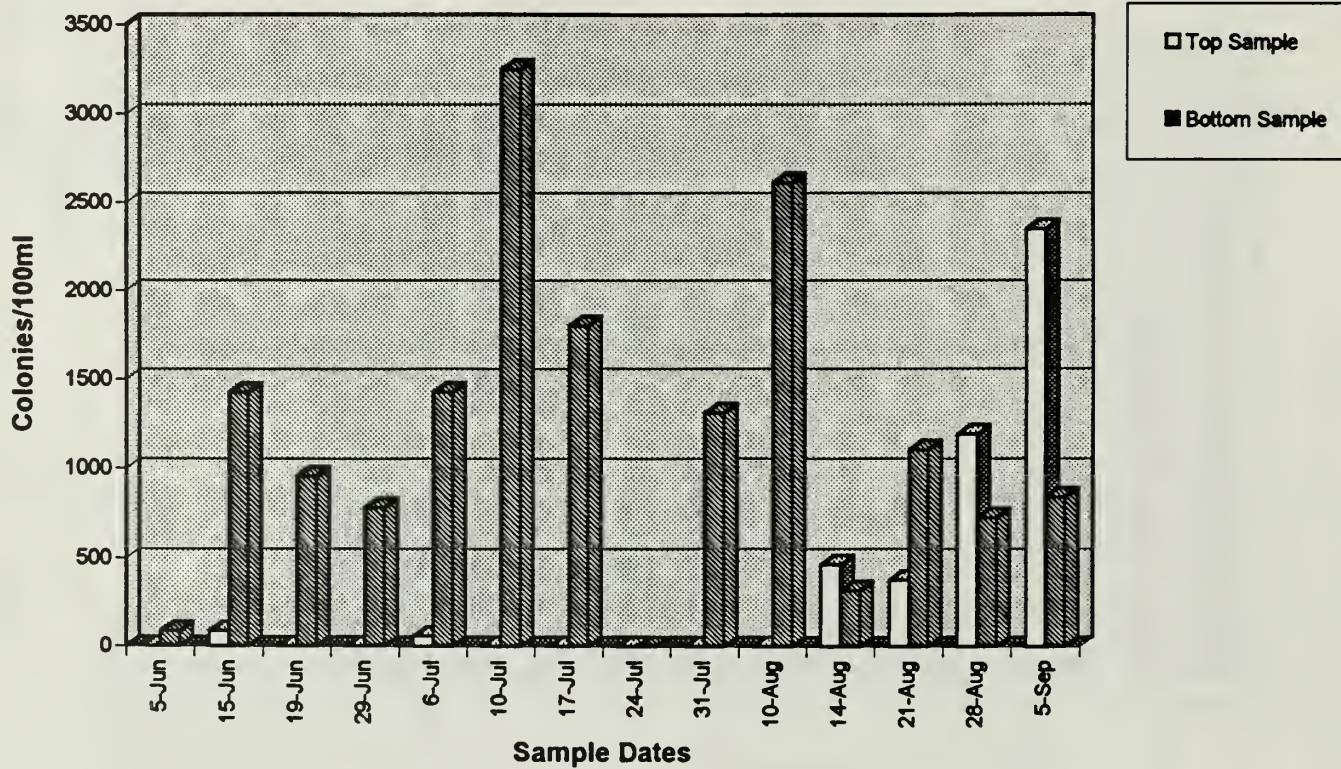


Figure 31

Bergen Basin (BB) Water Quality Measurements, 1995

Total Coliform Counts



Fecal Coliform Counts

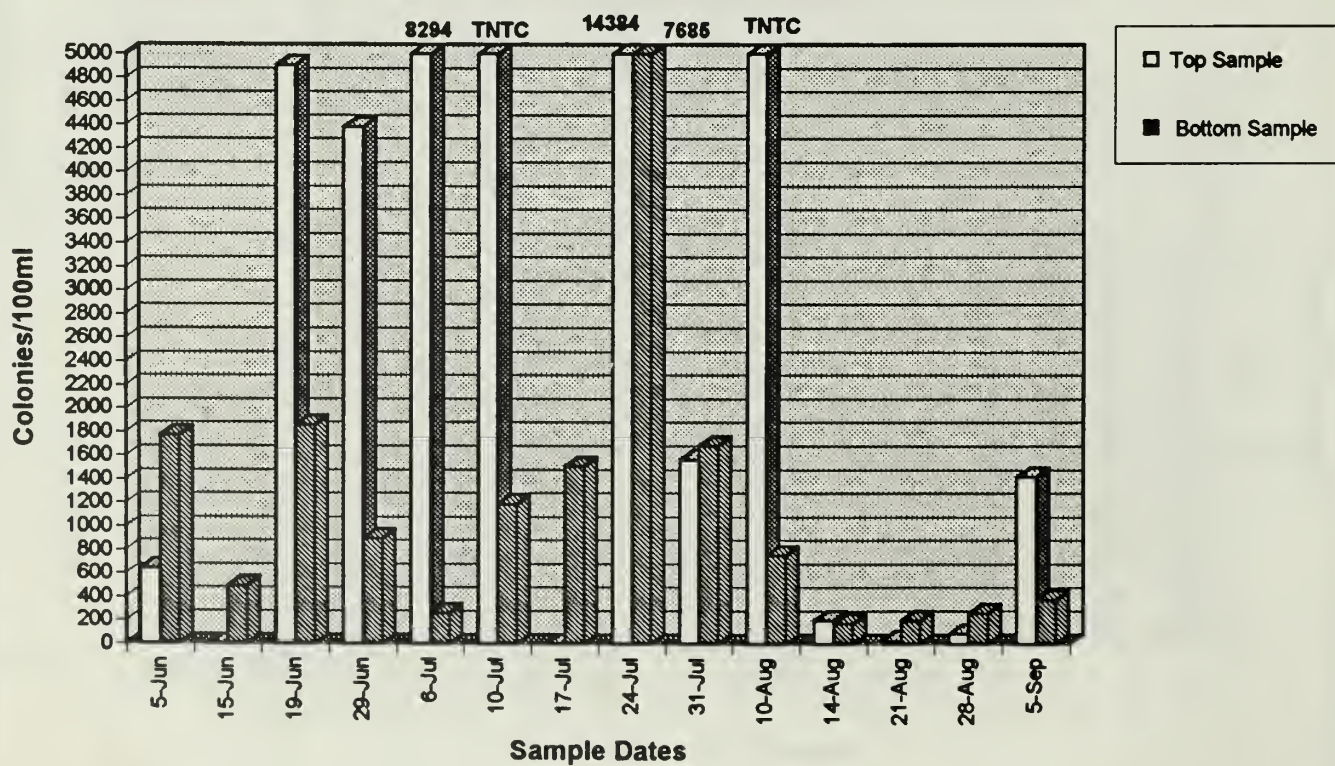


Figure 32

Jamaica Bay: Hendrix Creek [JB-6A], 1995

Date	Time	Air Temp(°F)	Water Temp (°C)		pH		Salinity (ppt)		Conductivity MMHO/cm		DO (mg/l)		Nitrates (mg/l)	
			Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	1005	85	20.0	20.0	7.50	7.70	24.0	23.0	321	310	7.80	7.80	N/D	N/D
6/15/95	0800	74	19.8	19.5	8.19	8.14	21.4	21.3	311	308	7.45	7.42	0.11	<0.1
6/19/95	0815	74	21.8	22.5	8.20	8.24	23.9	23.4	340	344	5.70	5.33	N/D	N/D
6/29/95	0805	62	19.8	19.8	7.85	7.82	21.3	22.2	308	322	4.48	3.87	0.17	0.16
7/06/95	0810	72	22.8	22.7	8.09	8.05	22.3	24.1	334	350	7.18	5.52	N/D	N/D
7/10/95	0815	69	22.0	21.9	7.94	7.92	25.0	25.0	345	348	4.48	8.62	0.23	0.18
7/17/95	0805	74	24.8	24.7	7.64	7.65	23.6	24.4	361	372	3.46	3.72	N/D	N/D
7/24/95	0825	79	25.6	24.9	8.21	7.94	22.9	23.3	348	358	6.21	3.72	0.25	0.22
7/31/95	0825	78	26.2	25.8	7.30	7.00	22.3	22.9	364	368	5.80	6.30	N/D	N/D
8/10/95	0815	71	22.8	23.0	7.77	7.81	24.1	24.7	363	370	3.76	4.09	0.13	0.12
8/14/95	1005	85	26.1	25.9	7.61	7.69	21.2	24.2	321	368	8.50	3.84	N/D	N/D
8/21/95	0925	79	25.3	24.8	7.93	7.96	22.1	25.4	348	392	8.69	8.80	0.28	0.22
8/28/95	0915	73	23.5	23.2	7.49	7.66	16.8	24.8	262	378	8.67	8.77	N/D	N/D
9/05/95	0850	73	23.1	23.1	7.26	7.35	17.3	25.2	269	382	8.08	8.15	0.50	0.50

Date	Total Chlorine mg/l		Free Chlorine mg/l		Phosphate (PO ₄) ppm		Chlorophyll a mg/m ³		Total Coliform Colonies/100 ml		Fecal Coliform Colonies/100 ml	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	986	1044	667	348
6/15/95	<0.05	<0.05	<0.05	<0.05	0.05	0.05	N/D	N/D	232	87	29	58
6/19/95	N/D	N/D	N/D	N/D	N/D	N/D	44.926	58	986	58	174	29
6/29/95	<0.05	<0.05	<0.05	<0.05	0.35	0.29	N/D	87	87	58	29	87
7/06/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	2146	174	1160	116	116
7/10/95	<0.05	<0.05	<0.05	<0.05	0.15	0.20	N/D	1595	377	29	174	174
7/17/95	N/D	N/D	N/D	N/D	N/D	N/D	2.062	1276	2204	3886	1450	1450
7/24/95	<0.05	<0.05	<0.05	<0.05	0.15	0.21	N/D	435	377	29	0	0
7/31/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	145	116	58	0	0
8/10/95	<0.05	<0.05	<0.05	<0.05	0.27	0.03	N/D	29	0	29	0	0
8/14/95	N/D	N/D	N/D	N/D	N/D	N/D	11.778	261	899	377	580	580
8/21/95	<0.05	<0.05	<0.05	<0.05	0.18	0.22	N/D	116	0	58	0	0
8/28/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	0	812	0	406	406
9/05/95	<0.05	<0.05	<0.05	<0.05	0.54	0.25	2.400	29	0	0	0	58

N/D: No Data.

Shaded area indicates samples that exceeded total coliform counts of 2400/100ml and fecal coliform counts of 200/100ml (New York & New Jersey State bacterial standard limits).

Hendrix Creek (JB-6A) Water Quality Measurements, 1995

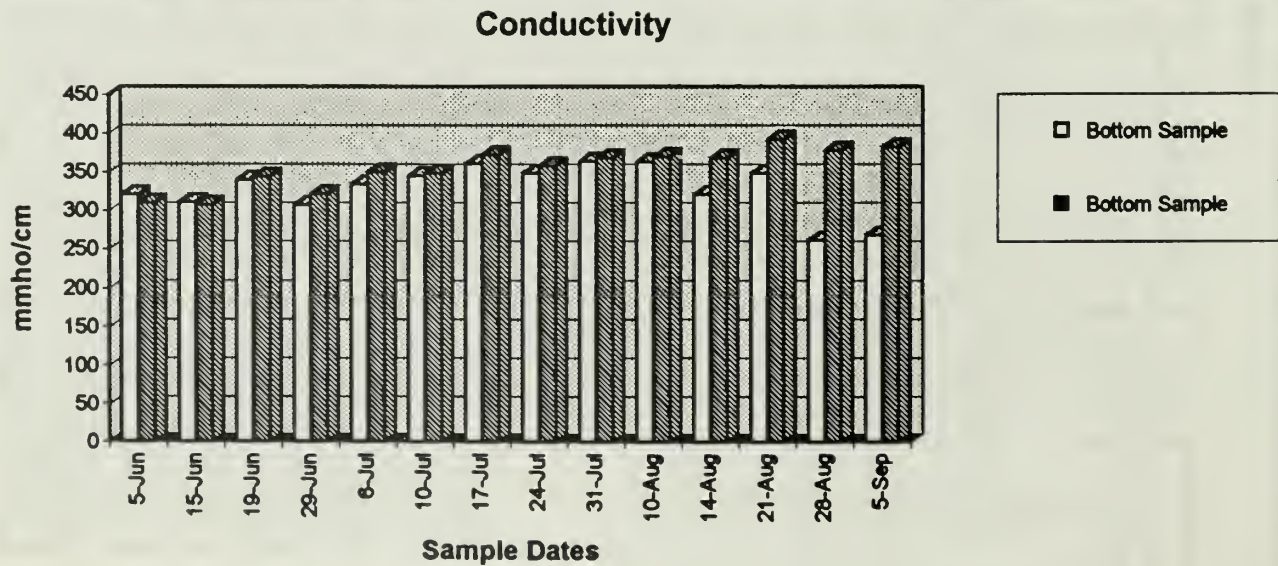
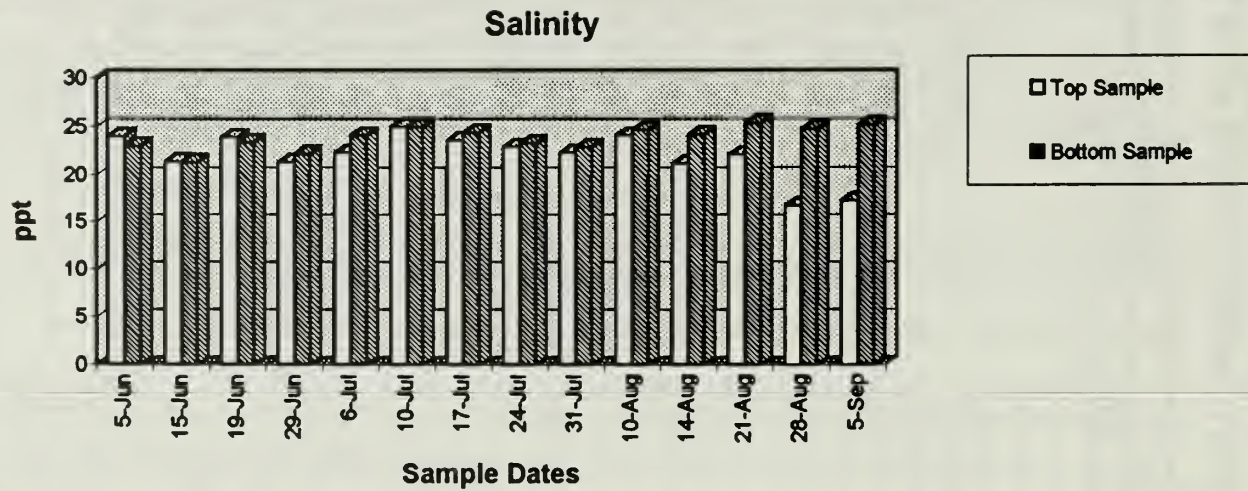
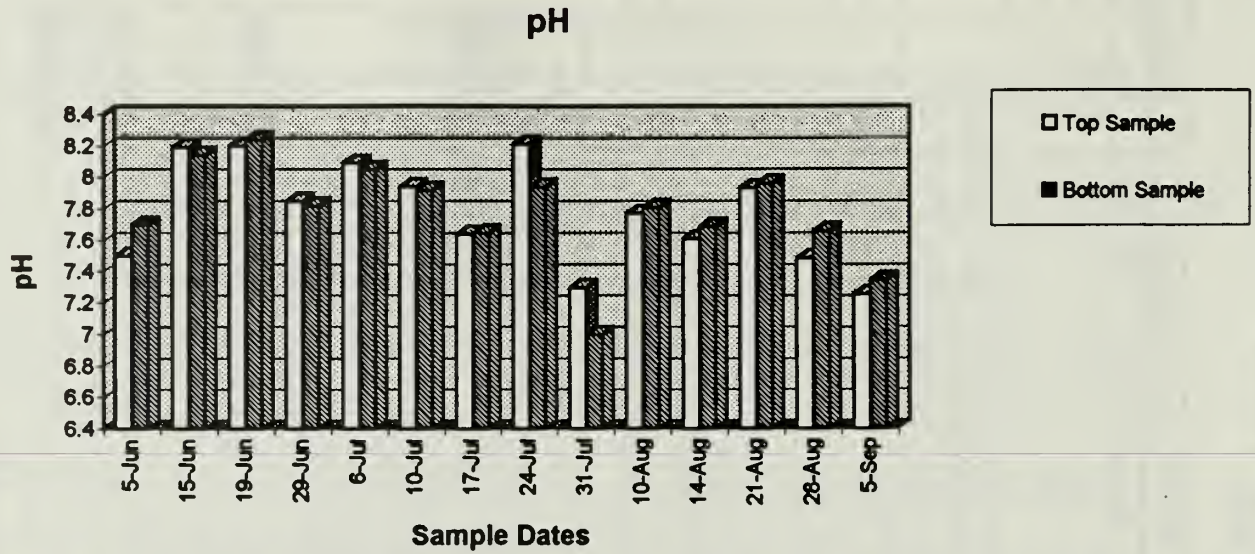
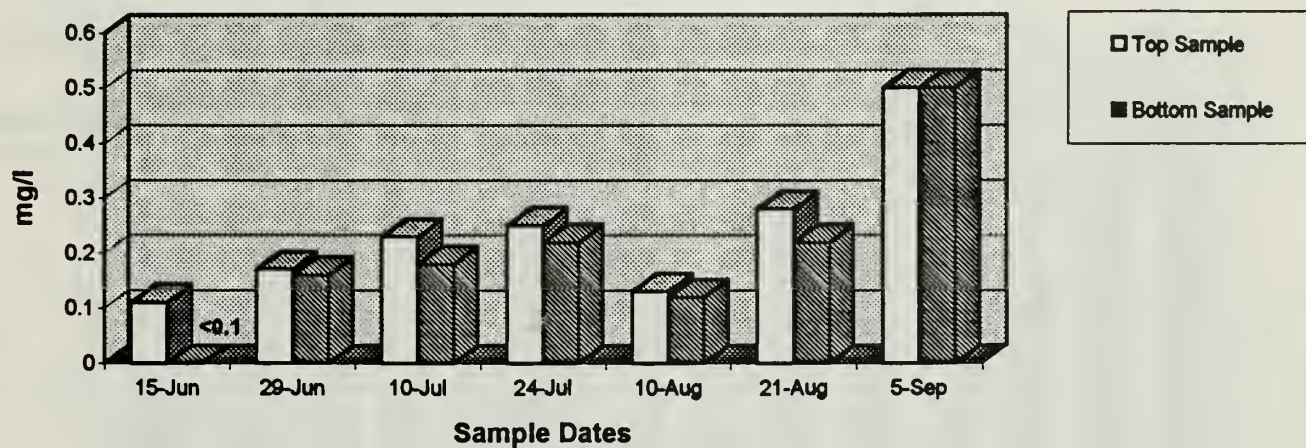


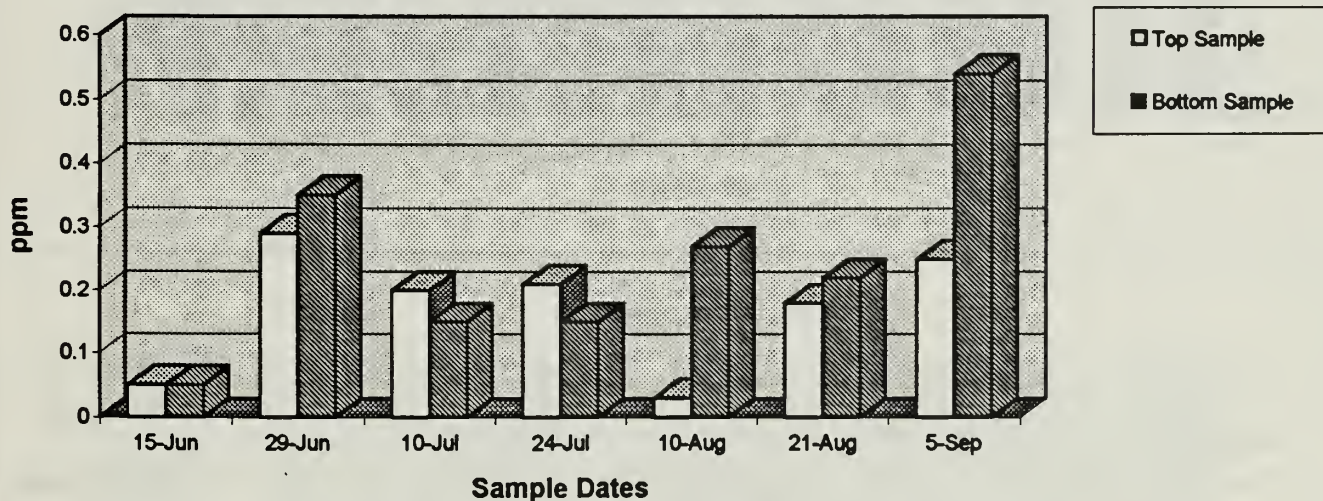
Figure 33

Bergen Basin Outflow (JB-9) Water Quality Measurements, 1995

Nitrates



Phosphate (PO_4)



Chlorophyll a

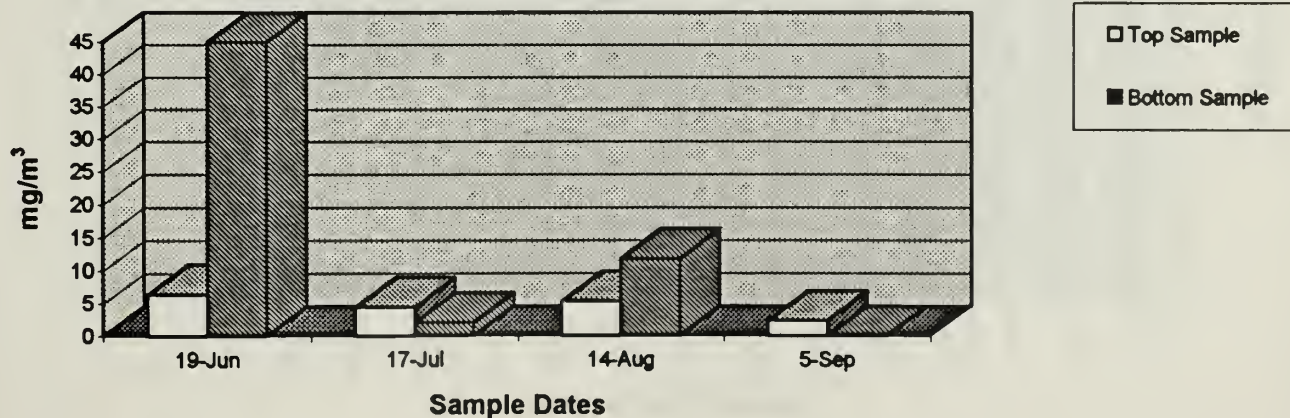
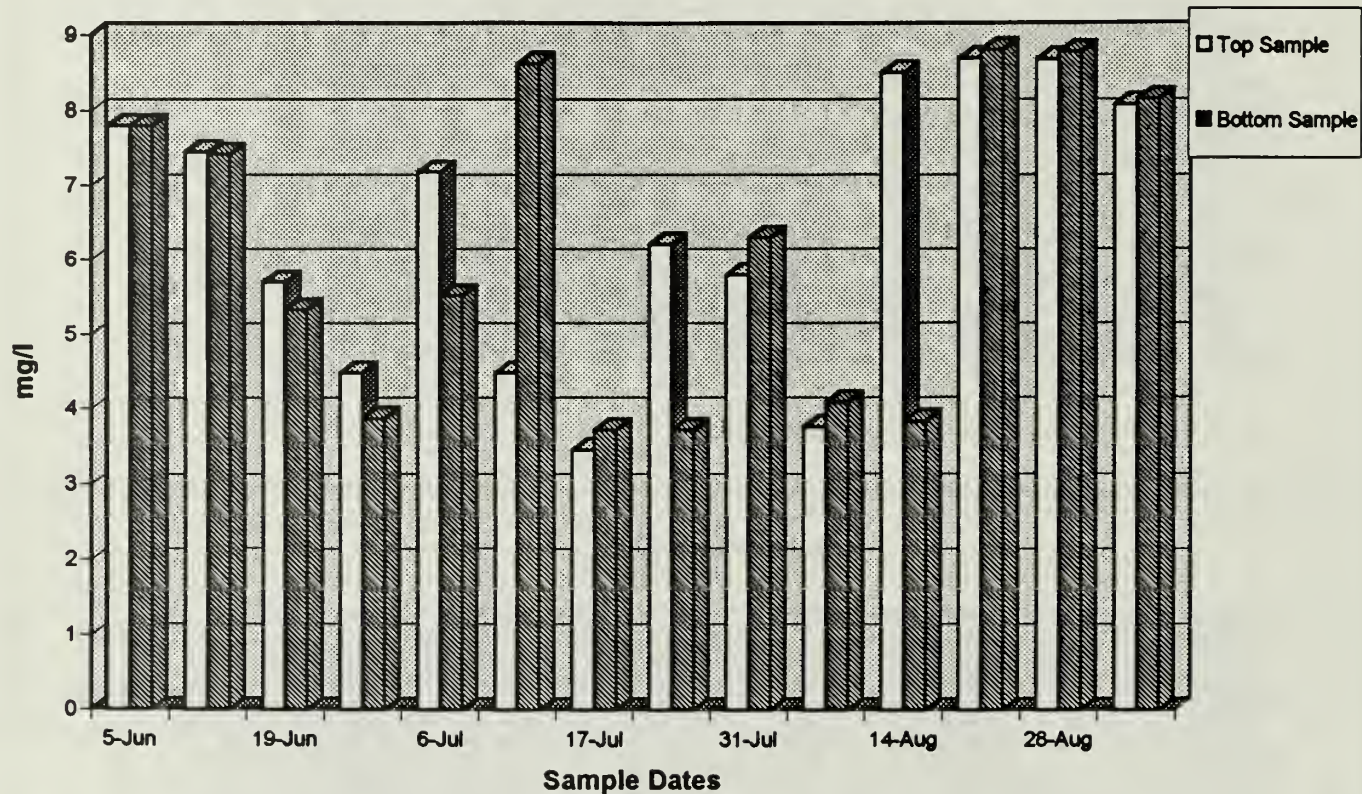


Figure 34

Hendrix Creek (JB-6A) Water Quality Measurements, 1995

Dissolved Oxygen



Water Temperature

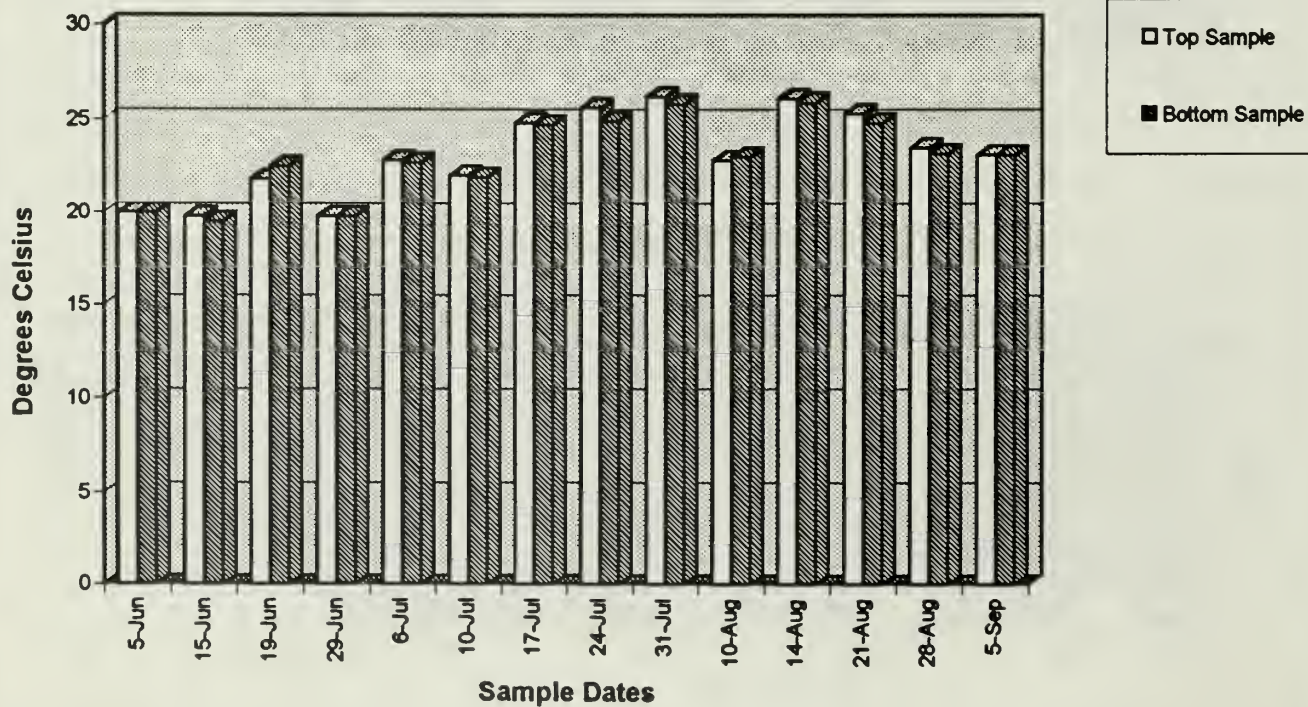


Figure 35

Hendrix Creek (JB-6A) Water Quality Measurements, 1995

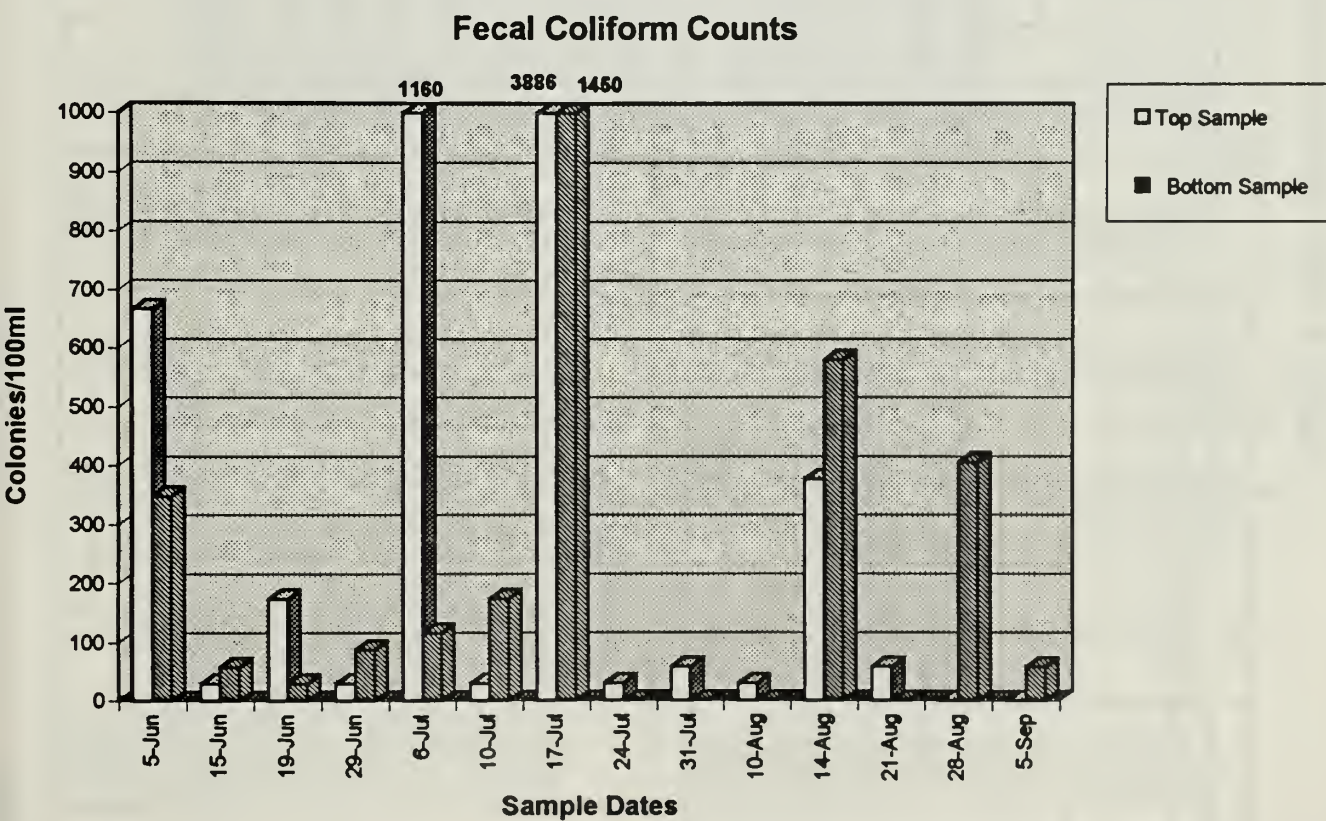
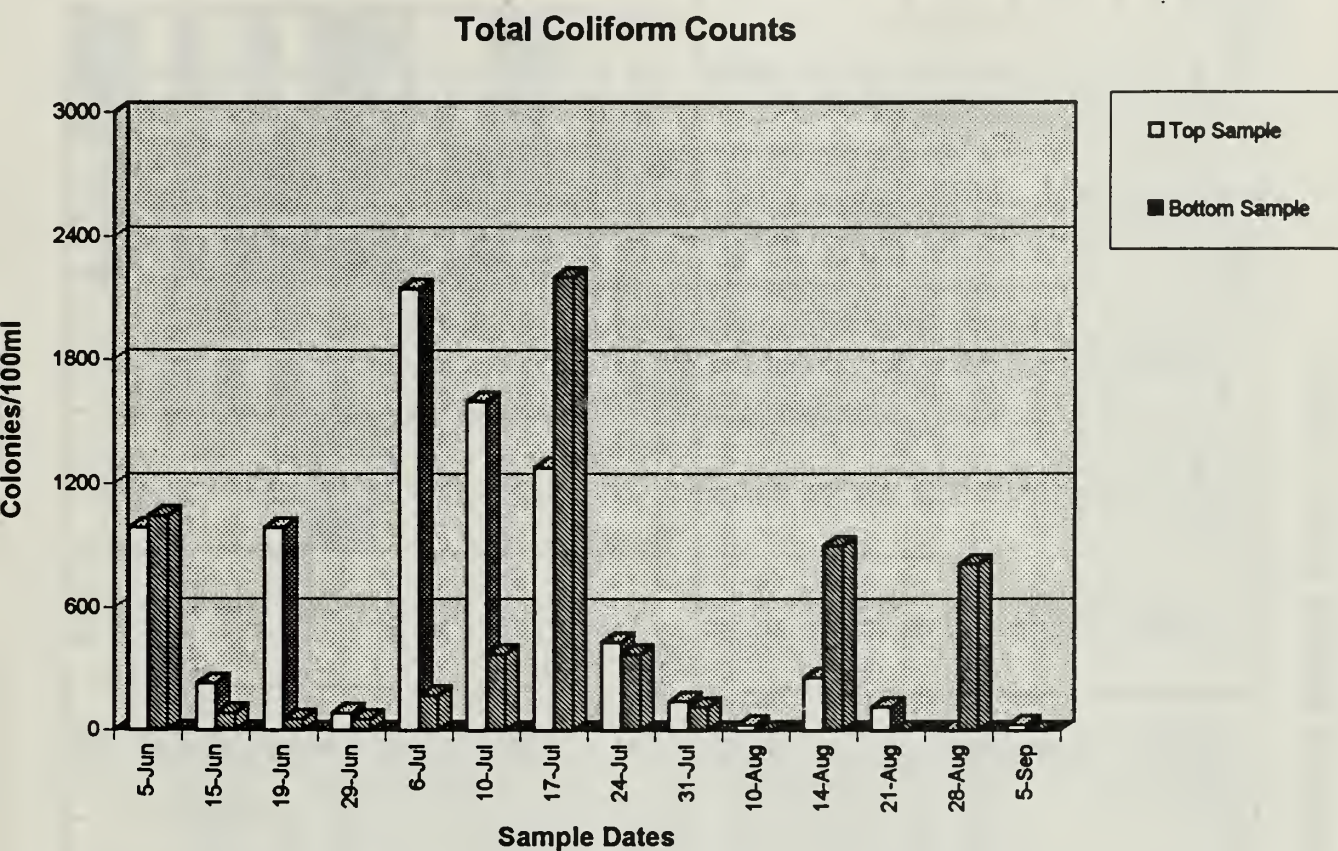


Figure 36

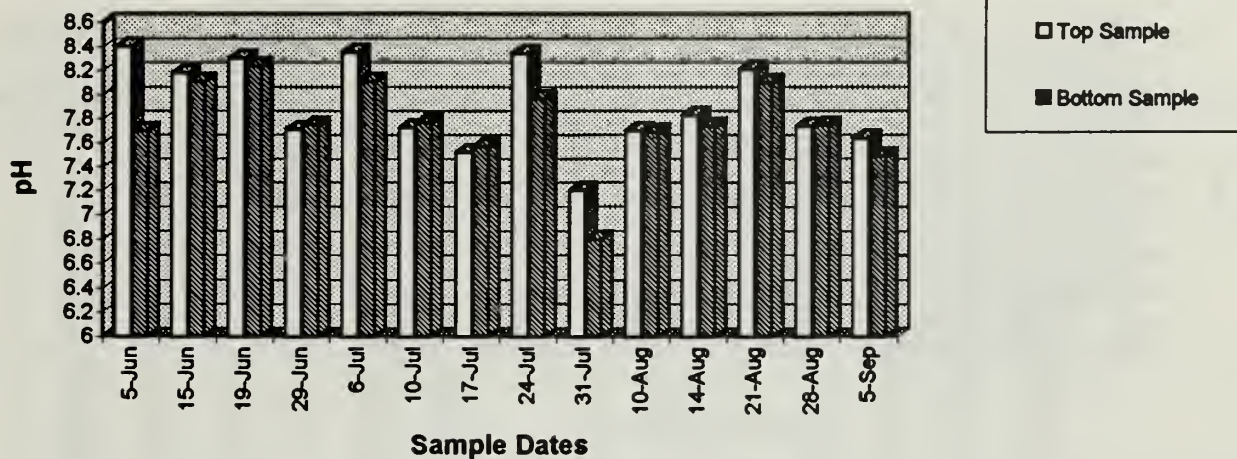
Table XIII
Environmental Water Quality Monitoring
Jamaica Bay: Pennsylvania Avenue Landfill [PAL], 1995

Date	Time	Air Temp(°F)		Water Temp (°C)		pH		Salinity (ppt)		Conductivity MMHO/cm		DO (mg/l)		Nitrates (mg/l)	
		Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	0950	85	20.0	20.0	8.40	7.70	23.5	21.0	290	320	290	8.00	7.80	N/D	N/D
6/15/95	0850	74	19.8	19.5	8.18	8.11	21.4	21.0	307	311	307	7.83	7.45	0.16	0.16
6/19/95	0825	83	22.5	21.4	8.30	8.24	23.5	24.4	355	354	355	7.60	5.44	N/D	N/D
6/29/95	0815	64	20.4	20.2	7.71	7.75	21.5	23.4	322	313	322	4.43	4.57	<0.1	<0.1
7/06/95	0820	74	22.8	22.6	8.35	8.11	21.2	22.6	331	312	331	10.72	5.93	N/D	N/D
7/10/95	0827	70	22.3	22.1	7.73	7.77	27.2	27.4	348	343	348	8.51	8.48	0.22	0.25
7/17/95	0815	75	24.6	24.5	7.52	7.57	23.0	22.8	352	353	352	3.04	3.34	N/D	N/D
7/24/95	0835	83	26.6	25.5	8.34	7.97	23.1	19.7	300	340	300	7.90	4.08	0.23	0.27
7/31/95	0835	79	26.1	26.0	7.20	6.80	22.4	23.1	370	362	370	2.30	4.80	N/D	N/D
8/10/95	0830	72	23.4	23.3	7.70	7.69	25.1	25.8	364	358	364	3.41	3.38	0.15	0.16
8/14/95	0950	82	25.7	25.5	7.83	7.74	23.0	22.7	354	352	354	8.59	4.26	N/D	N/D
8/21/95	0905	77	24.4	24.5	8.21	8.10	24.9	25.2	385	379	385	8.81	8.74	0.60	0.50
8/28/95	0850	72	22.6	22.6	7.74	7.75	24.7	24.7	377	372	377	8.62	8.66	N/D	N/D
9/05/95	0830	73	22.6	22.6	7.64	7.49	24.8	25.2	380	374	380	8.12	8.09	2.90	0.44

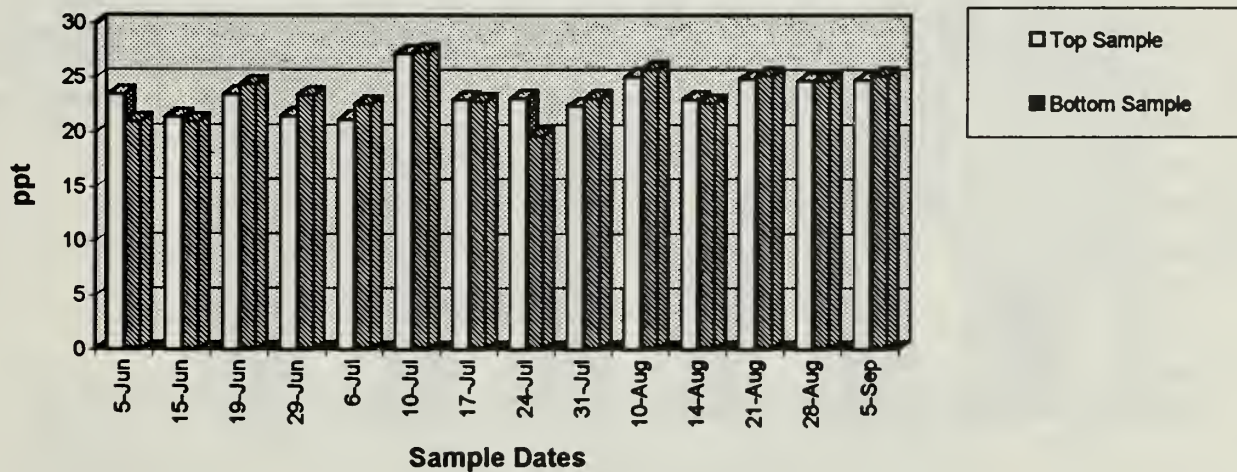
Date	Total Chlorine mg/l		Free Chlorine mg/l		Phosphate (PO ₄) ppm		Chlorophyll a mg/m ³		Total Coliform Colonies/100 ml		Fecal Coliform Colonies/100 ml	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
6/05/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	1421	406	928	377
6/15/95	<0.05	<0.05	<0.05	0.20	0.14	N/D	N/D	N/D	1160	1160	348	464
6/19/95	N/D	N/D	N/D	N/D	N/D	22.112	4.432	29	1624	29	464	29
6/29/95	<0.05	<0.05	<0.05	0.20	0.37	N/D	N/D	290	319	290	58	87
7/06/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	1015	2004	1015	928	580
7/10/95	<0.05	<0.05	<0.05	0.20	0.20	N/D	N/D	725	2900	725	783	261
7/17/95	N/D	N/D	N/D	N/D	N/D	2.062	1.738	2088	3248	2088	1827	1278
7/24/95	<0.05	<0.05	<0.05	0.20	0.36	N/D	N/D	435	1276	435	899	58
7/31/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	928	638	928	696	290
8/10/95	<0.05	<0.05	<0.05	0.30	0.27	N/D	N/D	290	232	290	87	87
8/14/95	N/D	N/D	N/D	N/D	N/D	11.762	11.454	957	1015	957	493	377
8/21/95	<0.05	<0.05	<0.05	N/D	N/D	N/D	N/D	29	174	29	145	0
8/28/95	N/D	N/D	N/D	N/D	N/D	N/D	N/D	609	1015	609	493	493
9/05/95	<0.05	<0.05	<0.05	0.20	0.41	4.700	4.700	261	232	261	87	261

Pennsylvania Avenue Landfill (PAL) Water Quality Measurements, 1995

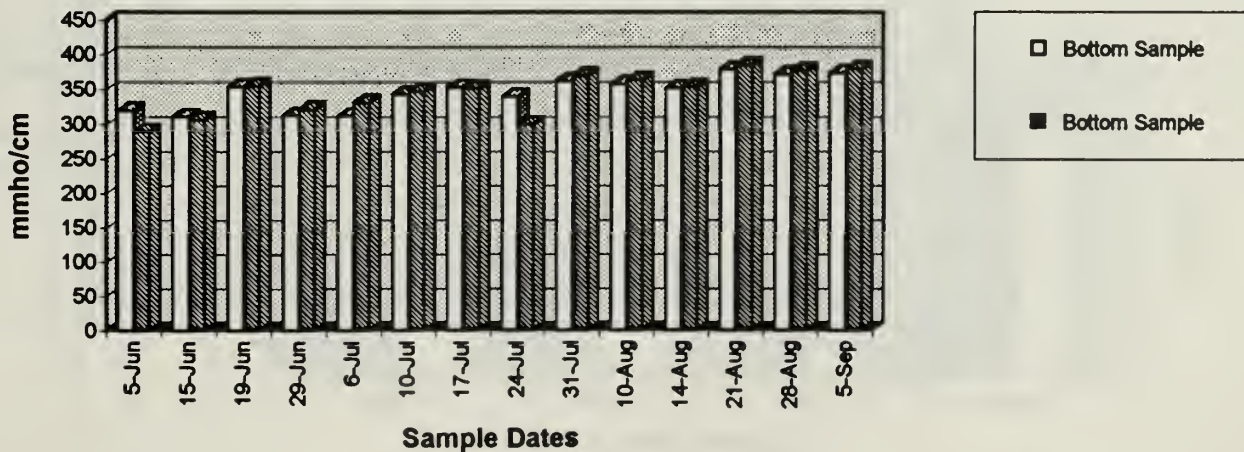
pH



Salinity



Conductivity



Pennsylvania Avenue Landfill (PAL) Water Quality Measurements, 1995

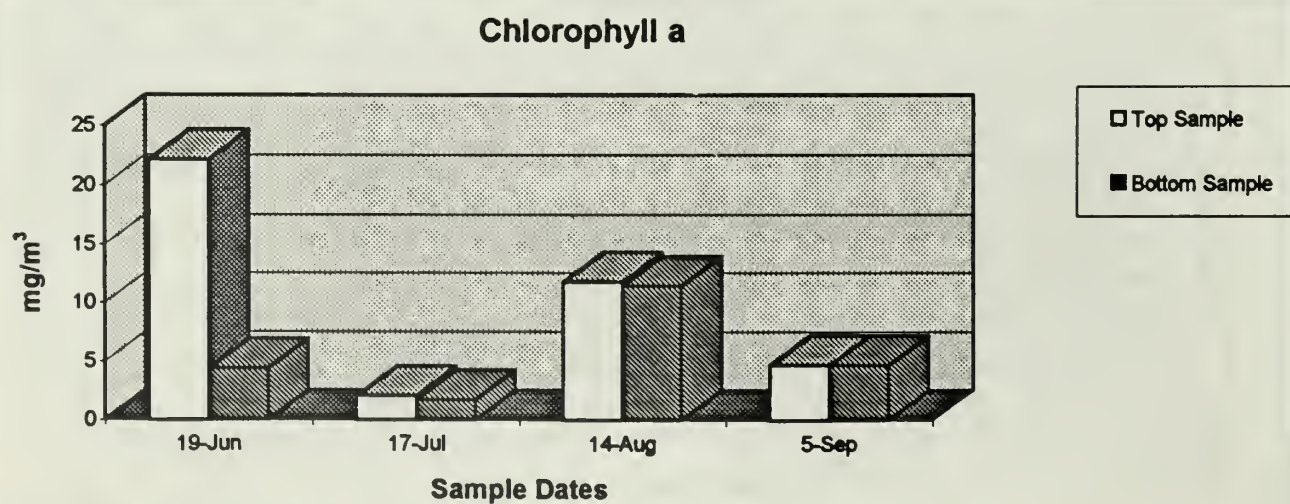
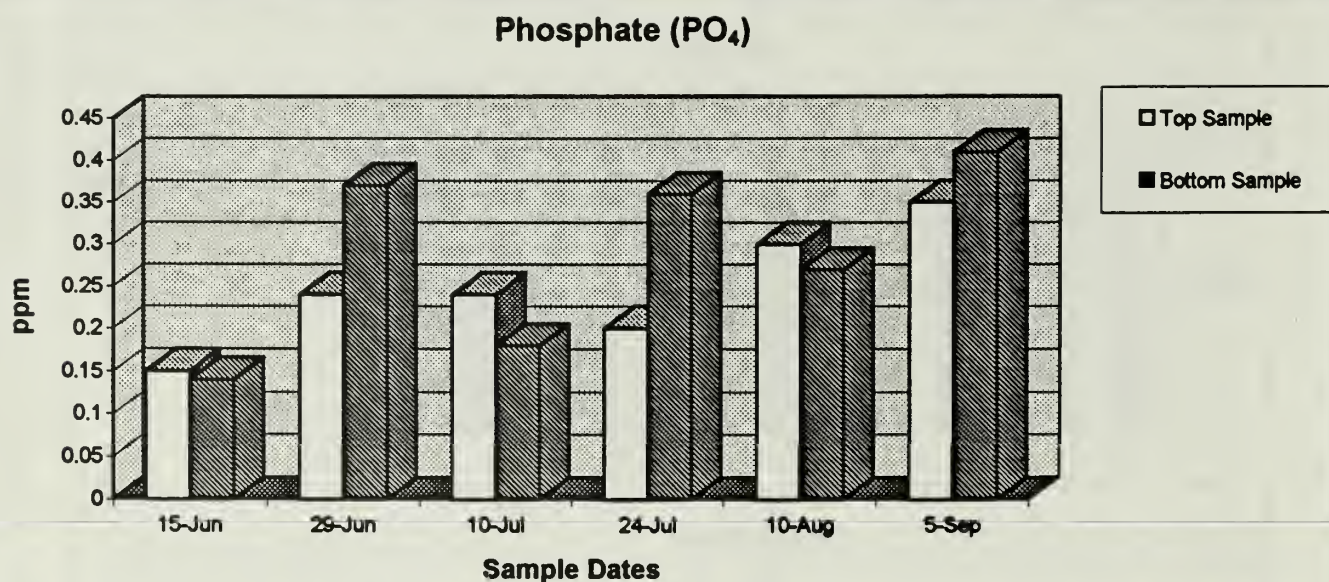
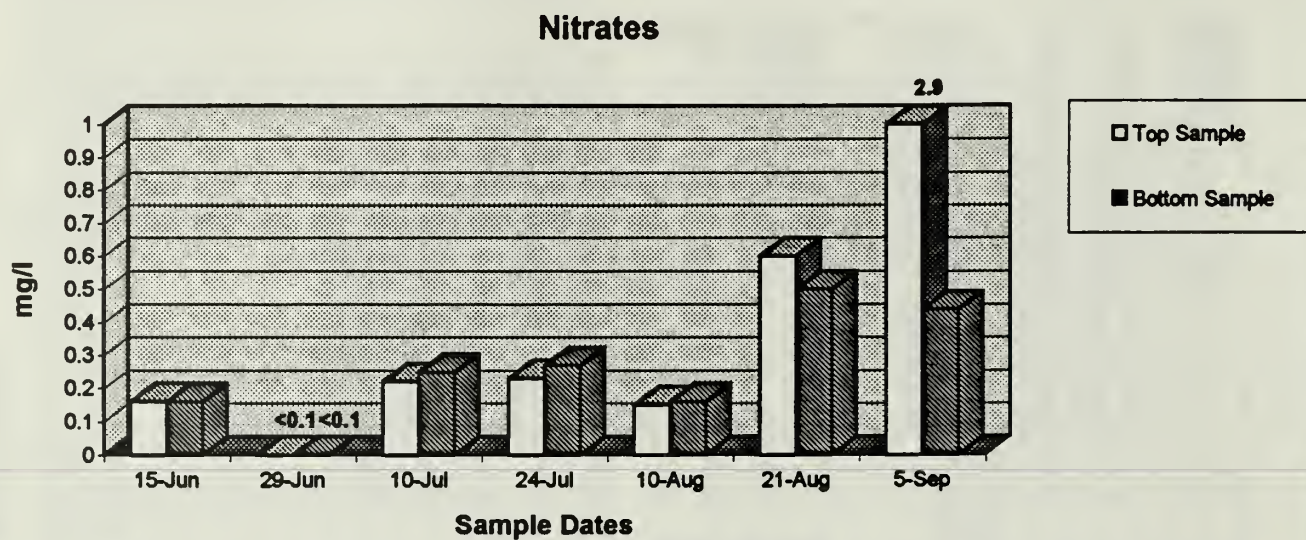
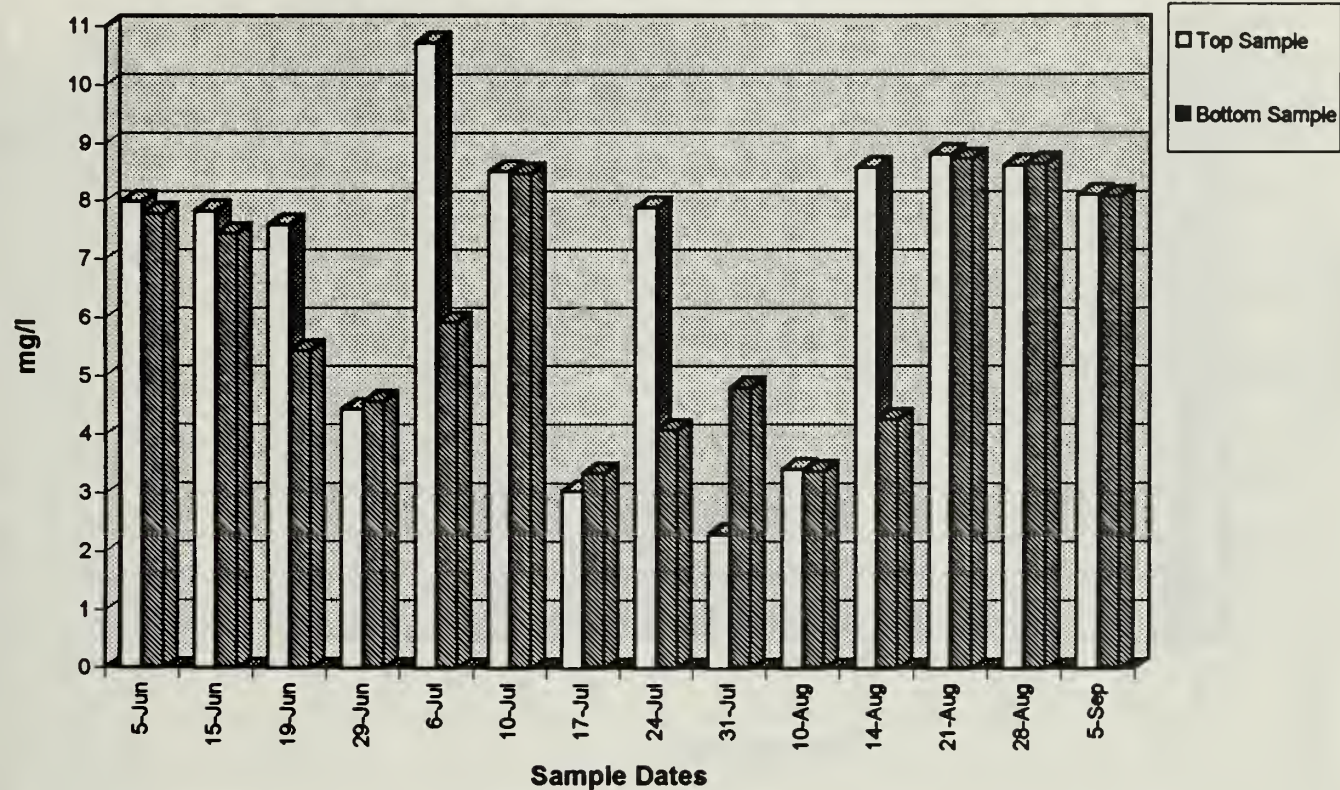


Figure 38

Pennsylvania Avenue Landfill (PAL) Water Quality Measurements, 1995

Dissolved Oxygen



Water Temperature

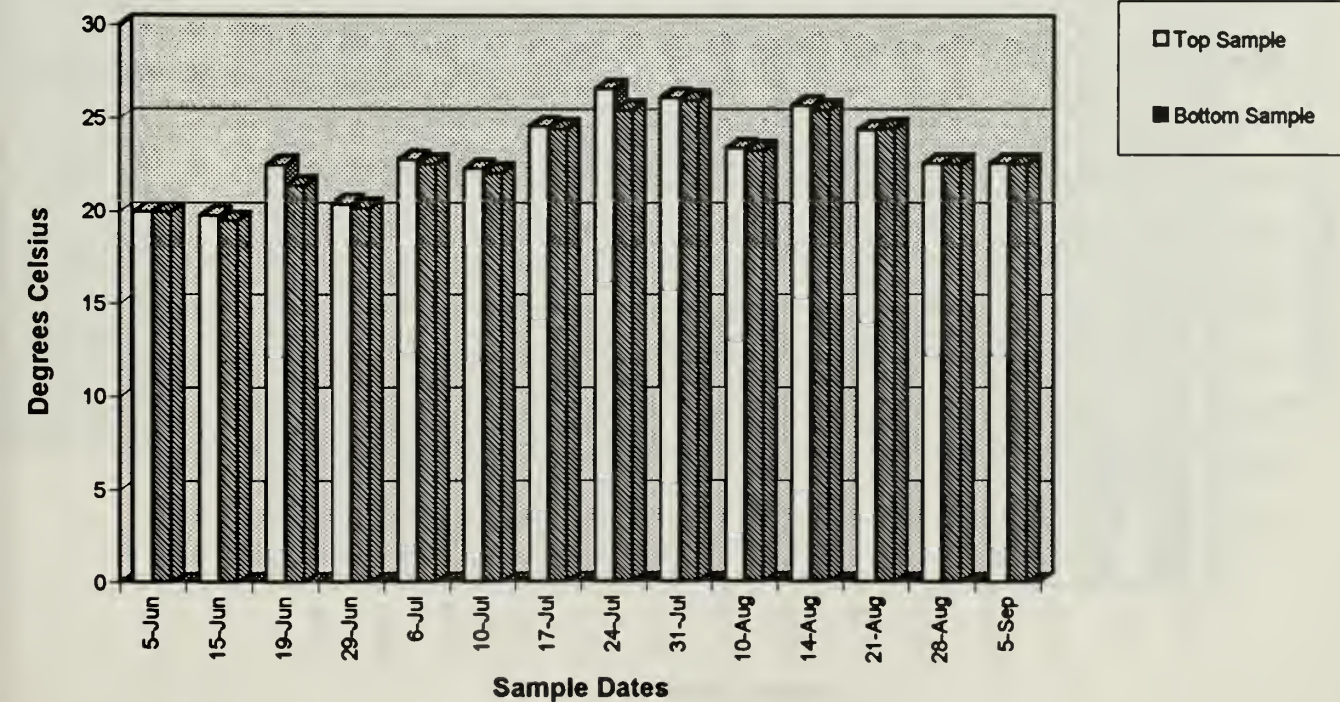
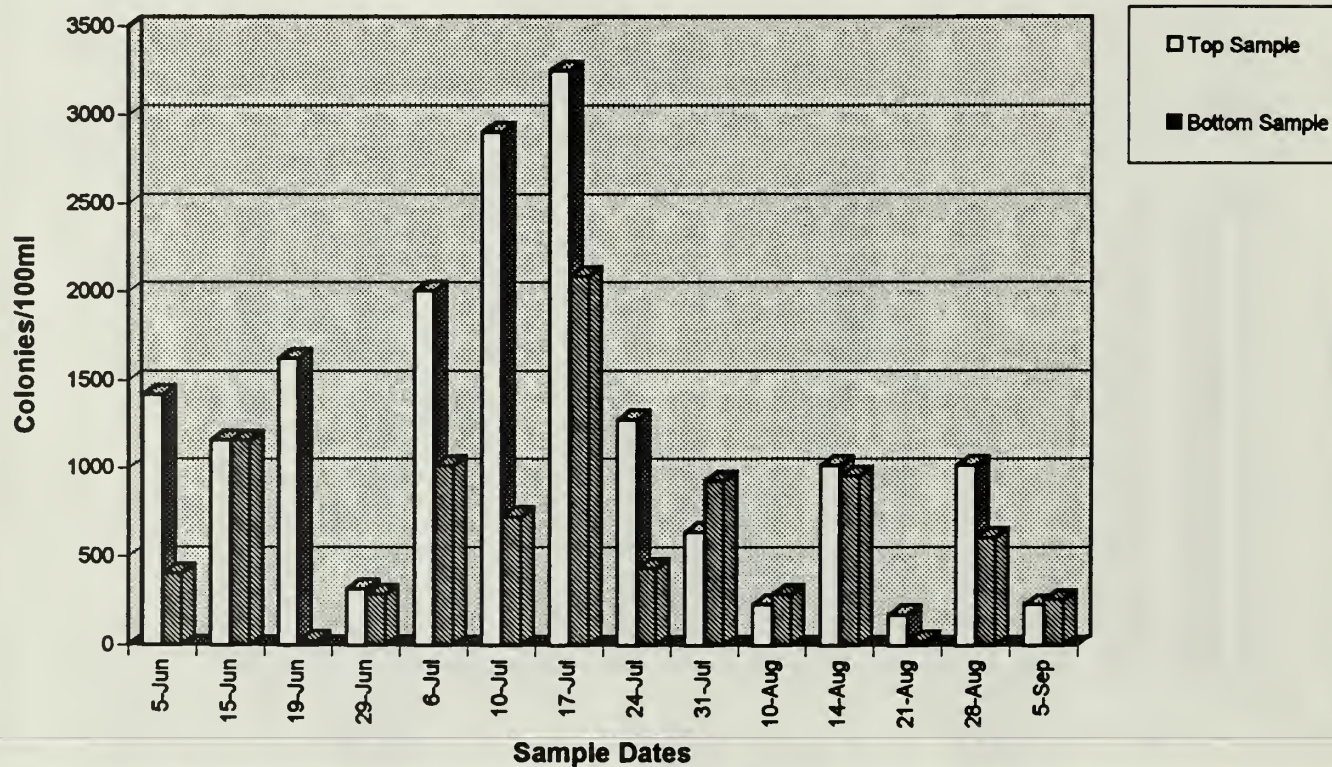


Figure 39

Pennsylvania Avenue Landfill (PAL) Water Quality Measurements, 1995

Total Coliform Counts



Fecal Coliform Counts

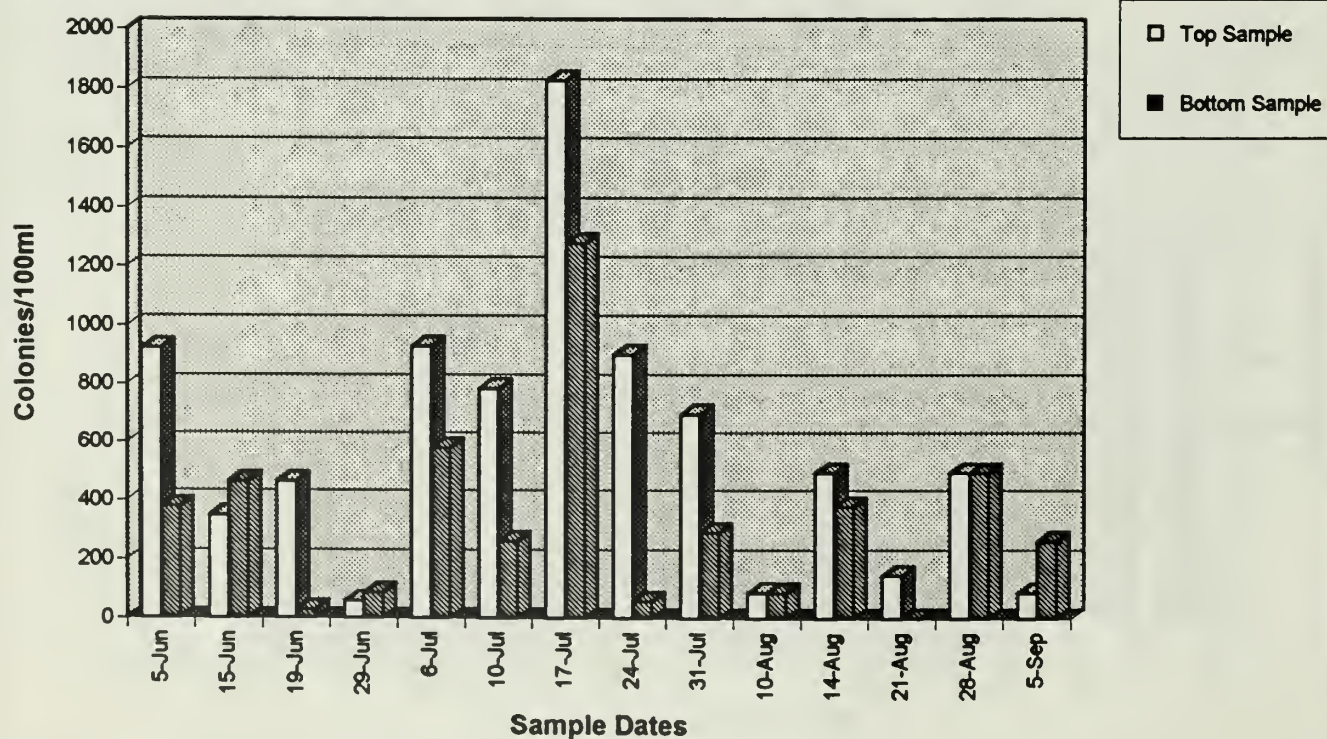


Figure 40

Table XIV
Beach Water Quality: Atlantic Beaches
Total & Fecal Coliform Counts, 1995

Date	Riis Park		Surf Club	
	Total	Fecal	Total	Fecal
6/06/95	29	29	0	0
6/12/95	0	0	0	0
6/20/95	174	145	0	0
6/27/95	0	0	0	0
7/05/95	174	29	29	0
7/11/95	0	0	0	29
7/18/95	145	0	29	0
7/25/95	0	29	58	29
8/01/95	29	29	0	0
8/08/95	29	29	0	87
8/15/95	29	29	29	0
8/22/95	87	87	0	0
8/29/95	0	29	29	29
9/06/95	0	0	0	0

Beach Water Quality: Atlantic Beaches Total and Fecal Coliform Counts, 1995

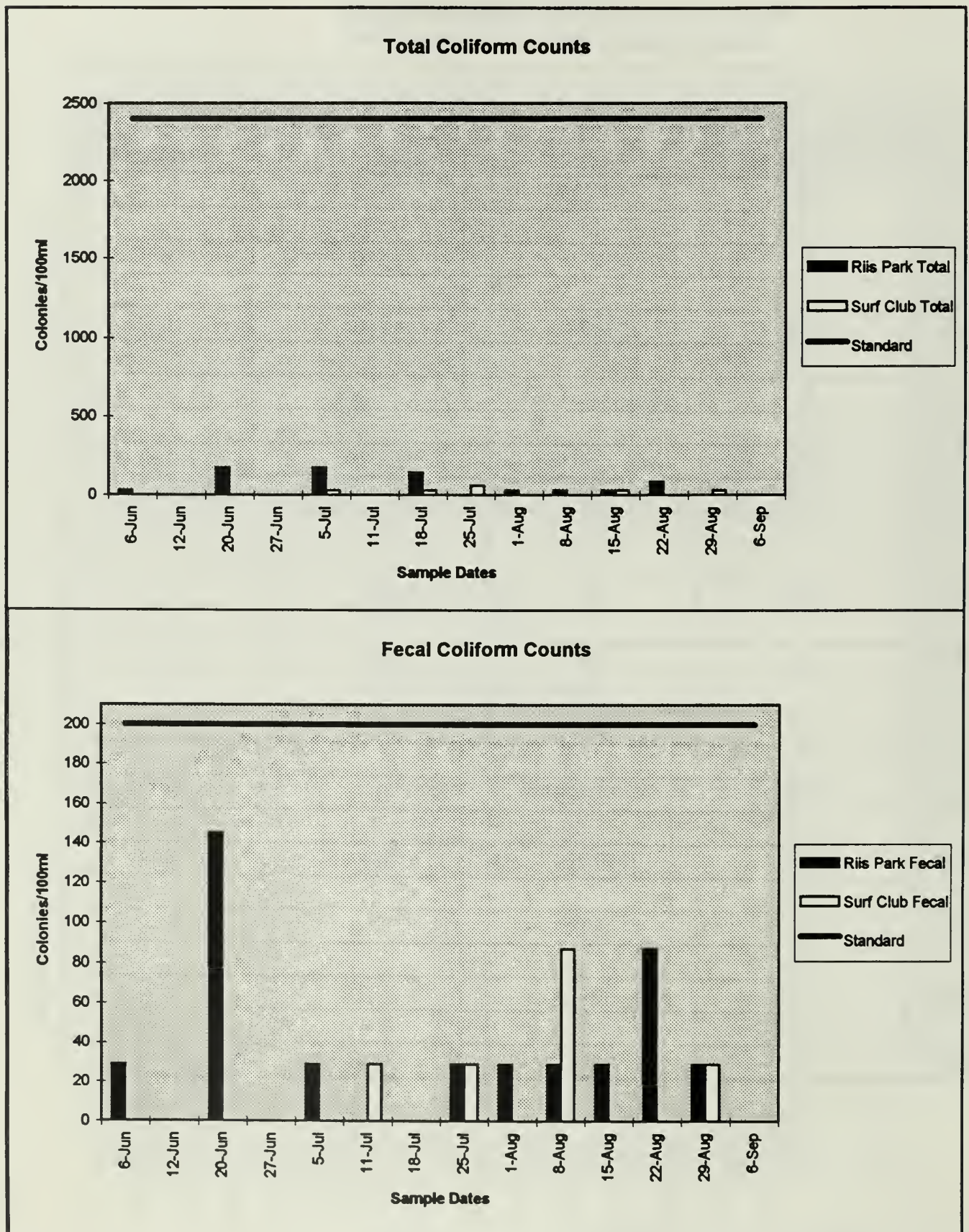


Figure 41

Water Quality: Staten Island

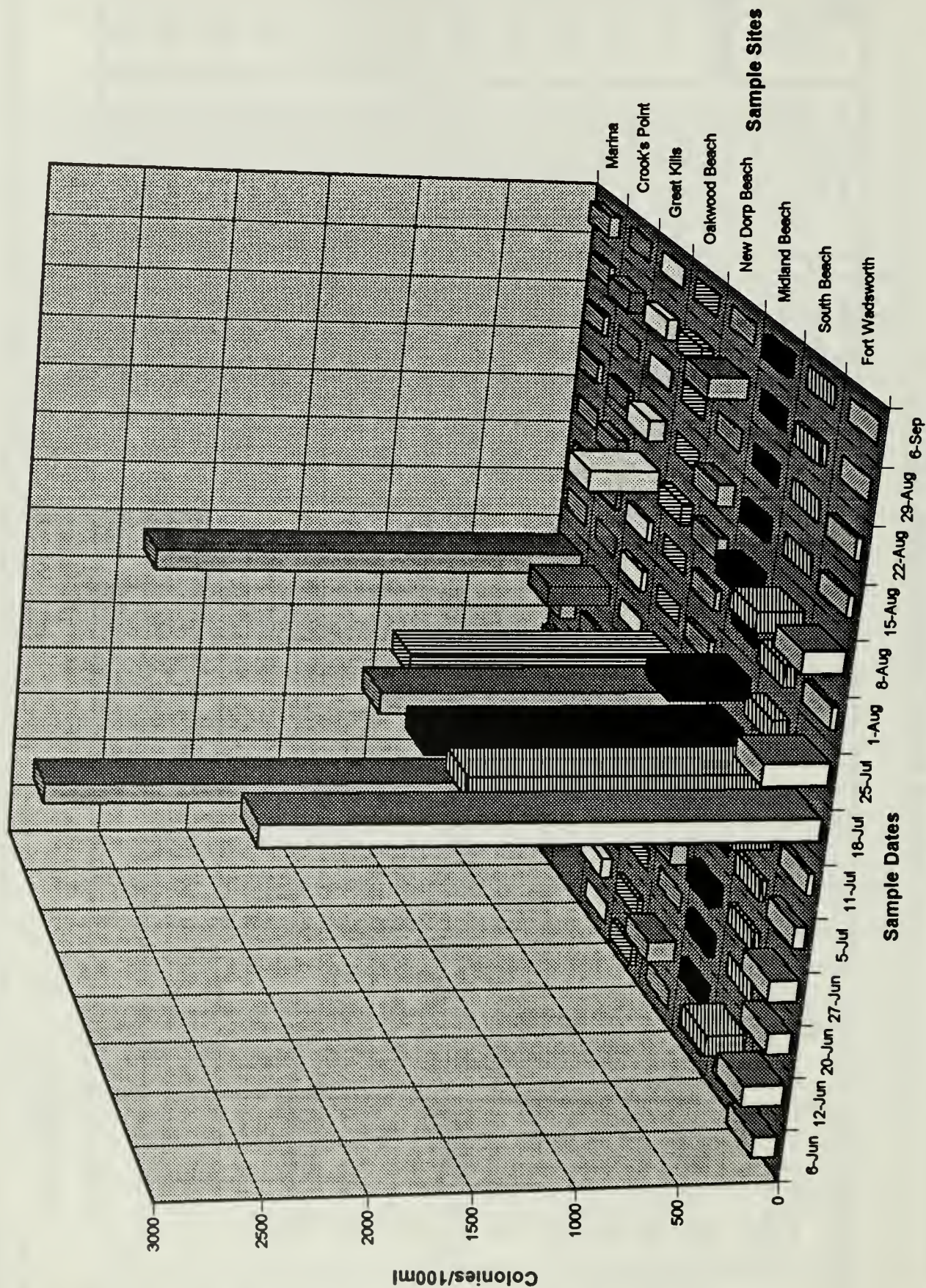
Total & Fecal Coliform Counts, 1995

Date	Fort Wadsworth FW-1		South Beach SB-2		Midland Beach MB-3		New Dorp Beach NDB-4		Oakwood Beach OB-5		Great Kills* GK-6		Crook's Point CP-7		Marina GKM-8	
	Total	Fecal	Total	Fecal	Total	Fecal	Total	Fecal	Total	Fecal	Total	Fecal	Total	Fecal	Total	Fecal
6/06/95	116	0	0	0	0	29	0	0	29	29	0	0	N/D	N/D	29	29
6/12/95	203	116	203	87	29	29	145	58	29	0	58	116	29	0	2900	1856
6/20/95	116	87	0	29	29	0	0	0	0	0	0	29	0	0	0	319
6/27/95	145	29	29	29	58	29	87	29	464	377	145	174	29	58	29	0
7/05/95	58	87	29	0	0	58	29	0	58	29	58	58	406	58	58	0
7/11/95	29	58	203	58	174	58	1131	232	116	29	116	145	29	0	87	29
7/18/95	2639	1798	1537	464	1595	1247	1682	580	1392	667	0	29	348	145	2378	7685
7/25/95	319	87	87	29	406	116	29	87	0	0	29	29	0	0	0	0
8/01/95	29	29	58	0	0	29	29	0	0	0	29	29	29	29	0	0
8/08/95	203	319	232	0	116	29	58	116	58	87	377	174	58	0	0	29
8/15/95	29	0	0	29	29	0	87	29	0	0	87	145	29	58	29	0
8/22/95	29	0	0	0	0	29	0	0	0	0	0	0	0	0	29	29
8/29/95	0	87	29	0	0	0	203	87	58	58	58	0	87	87	29	0
9/06/95	0	0	0	0	29	29	0	0	0	0	0	58	0	0	58	0

*Great Kills is a bathing beach site.

N/D: No Data

Shaded areas indicate sample dates that exceeded total coliform counts of 2400mg/100ml & fecal coliform counts of 200mg/100ml (New York & New Jersey State bacterial standard limits).

[illegible]

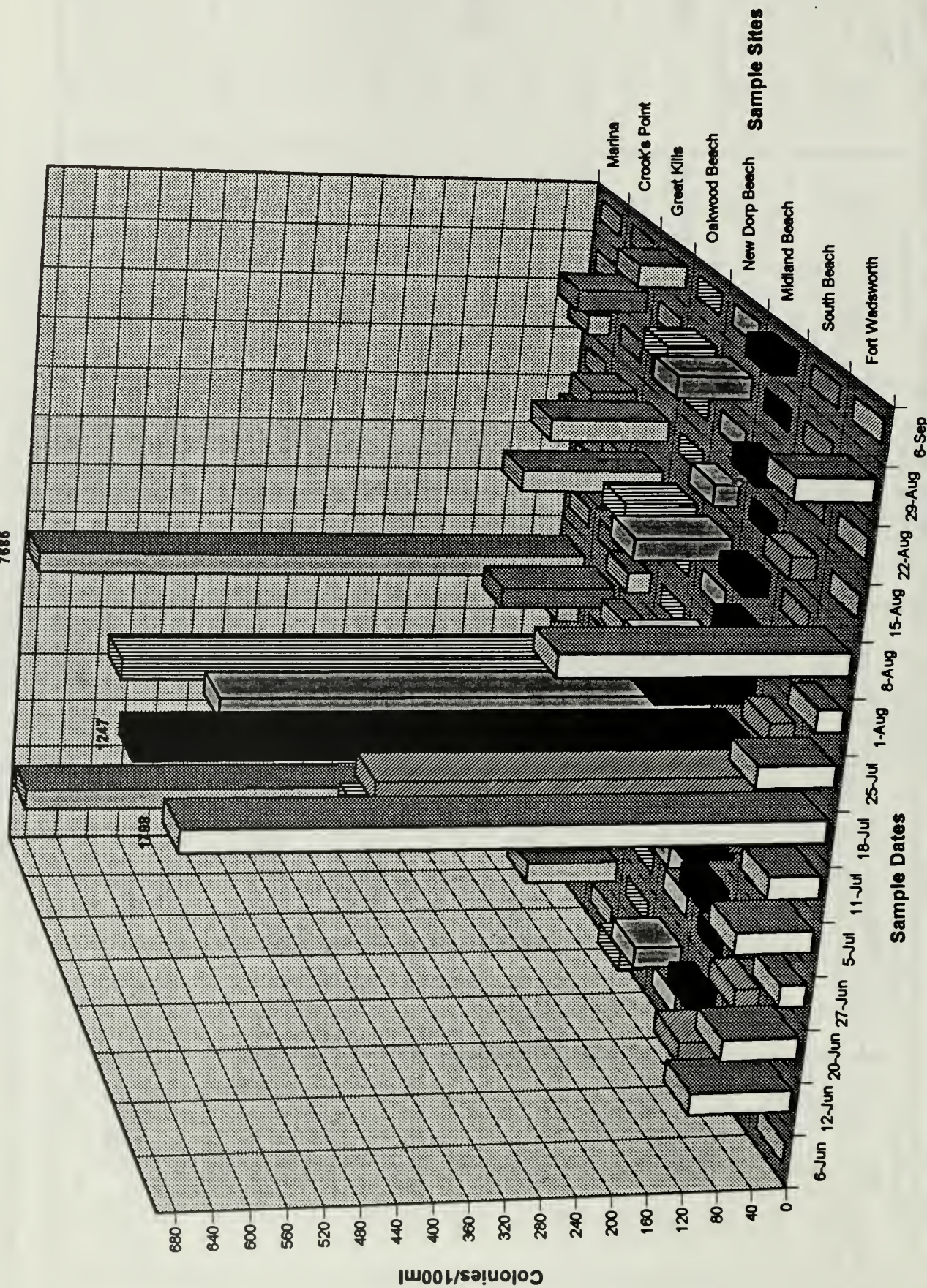
Date	Plum Island SH-1		Spermaceti Cove SH-2		Lot D* SH-3		Gunnison Beach* SH-4		North Beach* SH-5		Horseshoe Cove SH-6	
	Total	Fecal	Total	Fecal	Total	Fecal	Total	Fecal	Total	Fecal	Total	Fecal
6/07/95	29	29	0	0	87	29	0	29	0	29	203	116
6/14/95	203	203	261	145	29	58	0	0	0	29	116	87
6/21/95	0	348	29	29	29	58	0	0	0	29	116	87
6/28/95	493	812	203	406	232	319	464	522	580	261	812	377
6/29/95	N/D	N/D	N/D	N/D	58	0	0	58	87	29	N/D	N/D
6/30/95	N/D	N/D	N/D	N/D	0	0	435	116	58	116	N/D	N/D
7/05/95	0	0	290	319	0	29	464	174	0	29	29	87
7/12/95	0	29	116	58	58	29	0	58	0	0	348	435
7/19/95	116	58	0	29	0	0	0	0	0	0	58	29
7/26/95	29	0	580	1044	29	29	0	0	29	0	29	145
8/02/95	0	0	0	29	29	58	0	0	29	0	0	58
8/09/95	0	0	29	203	29	58	29	87	0	58	29	0
8/16/95	0	0	0	58	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
8/23/95	0	0	116	87	0	0	0	0	0	0	0	0
8/30/96	2377	2320	116	203	0	0	0	0	0	0	174	232
9/06/96	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

* Lot D, Gunnison Beach, and North Beach are bathing beach sites.

N/D: No Data

Shaded areas indicate sample dates that exceeded total coliform levels of 2400mg/100ml & fecal coliform counts of 200mg/100ml (New York & New Jersey State bacterial standard limits).

7685



Sandy Hook Total Coliform Counts, 1995

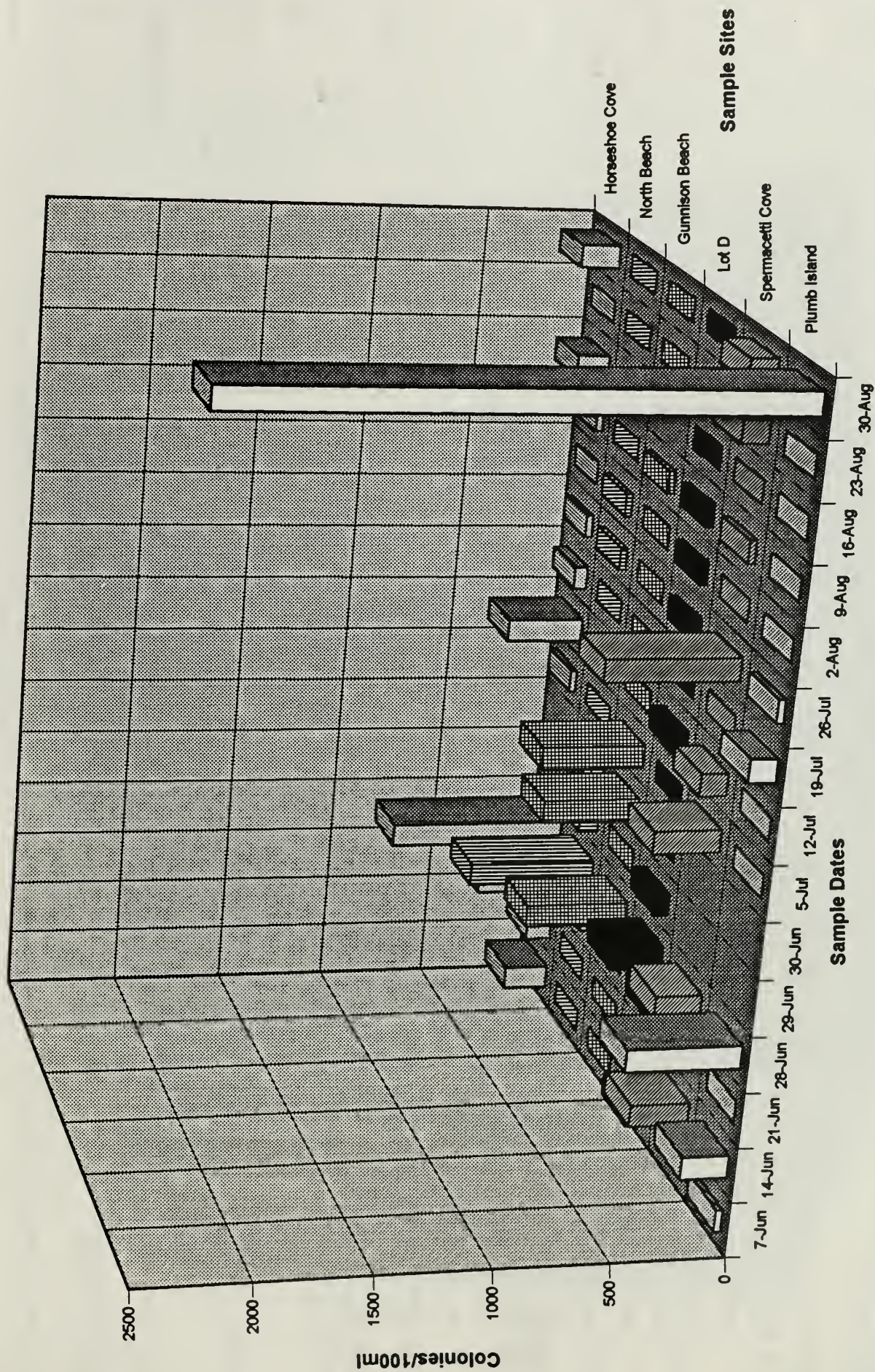
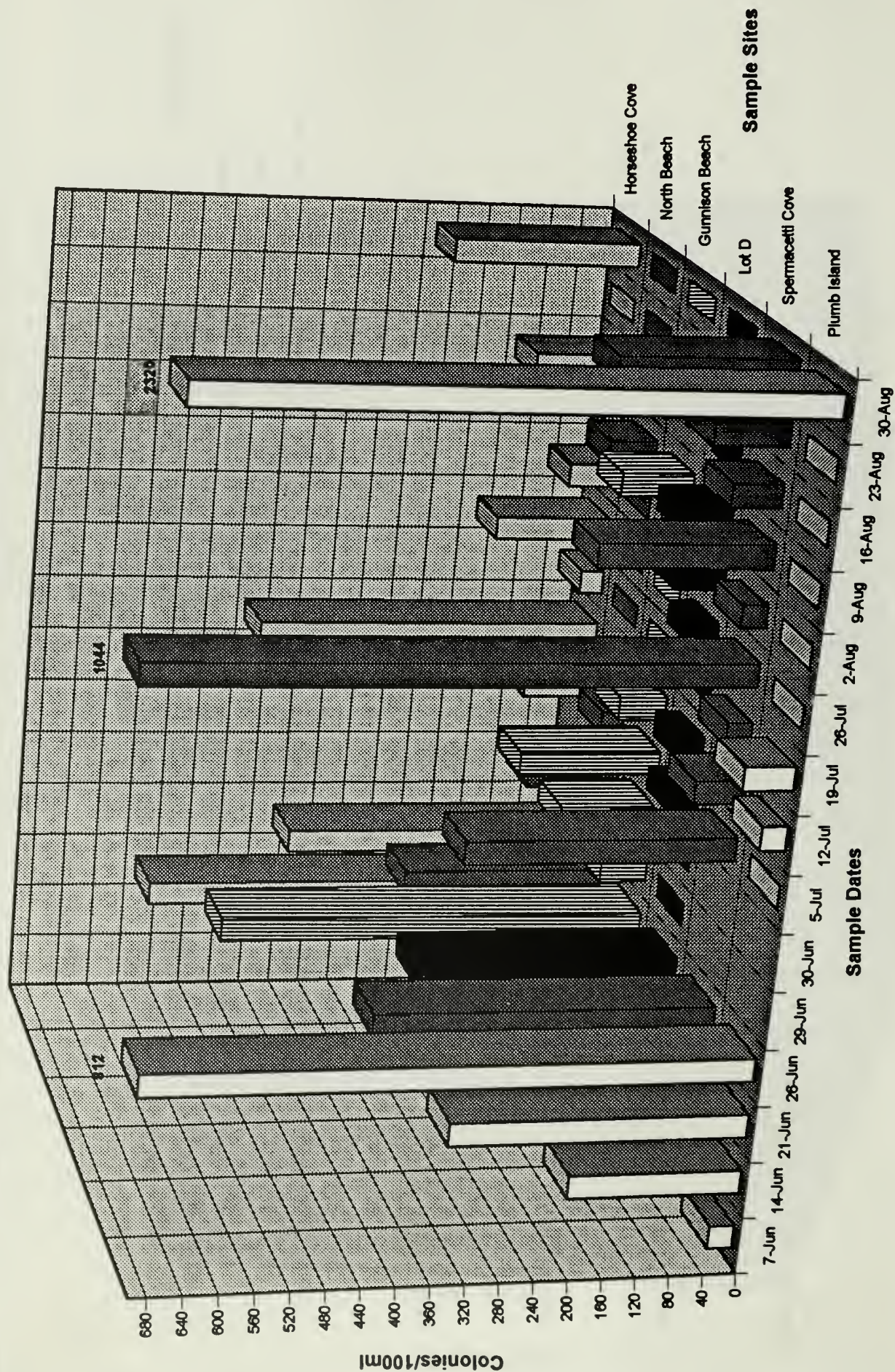


Figure 44

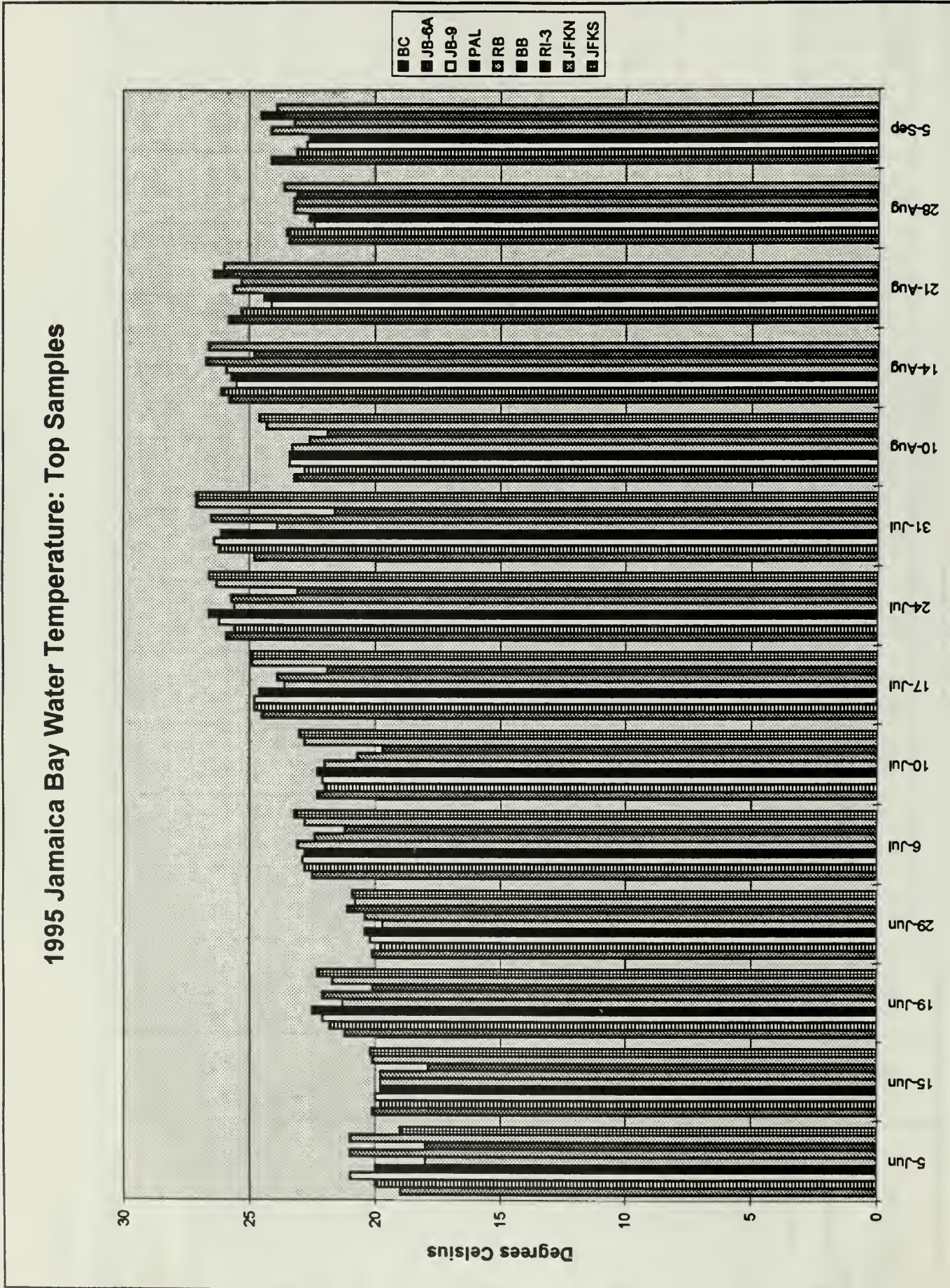
Sandy Hook Fecal Coliform Counts, 1995



1995

Sample Location	Site	Depth	Sample Dates													
			6/05	6/15	6/19	6/29	7/06	7/10	7/17	7/24	7/31	8/10	8/14	8/21	8/28	9/05
Beach Channel	BC	Top	19.0	20.1	21.2	20.1	22.5	22.3	24.5	25.9	24.8	23.2	25.8	25.8	23.4	24.1
		Bottom	19.0	19.1	21.4	19.8	22.3	21.9	24.3	25.8	24.7	23.1	25.7	26.1	23.3	24.2
Hendrix Creek	JB-6A	Top	20.0	19.8	21.8	19.8	22.8	22.0	24.8	25.6	26.2	22.8	26.1	25.3	23.5	23.1
		Bottom	20.0	19.5	22.5	19.8	22.7	21.9	24.7	24.9	25.8	23.0	25.9	24.8	23.2	23.1
Bergen Basin Outflow	JB-9	Top	21.0	20.0	22.1	20.2	22.9	22.1	24.8	26.2	26.4	23.4	25.5	24.1	22.4	22.7
		Bottom	21.0	19.8	21.8	20.2	22.8	22.0	25.2	26.1	26.6	23.7	25.5	24.0	22.5	22.4
Ruffle Bar	RB	Top	18.0	19.8	21.3	19.7	23.1	22.0	23.6	25.6	23.9	23.3	25.9	25.6	23.2	24.1
		Bottom	18.0	19.5	21.1	19.6	23.0	21.9	23.4	25.5	23.1	23.0	25.3	25.3	23.0	24.1
Pennsylvania Avenue Landfill	PAL	Top	20.0	19.8	22.5	20.4	22.8	22.3	24.6	26.6	26.1	23.4	25.7	24.4	22.6	22.6
		Bottom	20.0	19.5	21.4	20.2	22.6	22.1	24.5	25.5	26.0	23.3	25.5	24.5	22.6	22.6
Bergen Basin	BB	Top	21.0	19.8	22.1	20.4	22.4	20.7	23.9	25.7	26.5	22.6	26.7	25.3	23.2	23.2
		Bottom	21.0	19.8	22.1	20.3	22.3	22.6	24.8	26.1	26.8	23.1	25.3	25.3	22.9	23.0
Rockaway Inlet	RI-3	Top	18.0	17.9	20.1	21.1	21.2	19.7	21.9	23.1	21.6	21.9	24.8	26.4	23.1	24.5
		Bottom	17.0	17.7	19.8	21.1	21.0	19.3	21.7	23.0	21.5	21.9	N/D	N/D	N/D	N/D
JFK North of Runway Extension	JFKN	Top	21.0	20.1	21.7	20.8	22.8	22.8	24.9	26.3	27.1	24.3	26.6	26.0	23.6	23.9
		Bottom	20.0	20.1	22.8	20.5	22.7	22.6	24.9	26.2	27.0	24.1	N/D	N/D	N/D	N/D
JFK South of Runway Extension	JFKS	Top	19.0	20.2	22.3	20.9	23.2	23.0	24.9	26.6	27.1	24.6	N/D	N/D	N/D	N/D
		Bottom	20.0	20.0	21.9	20.6	23.0	22.8	24.9	25.9	26.9	23.9	N/D	N/D	N/D	N/D

N/D: No Data.

[illegible]

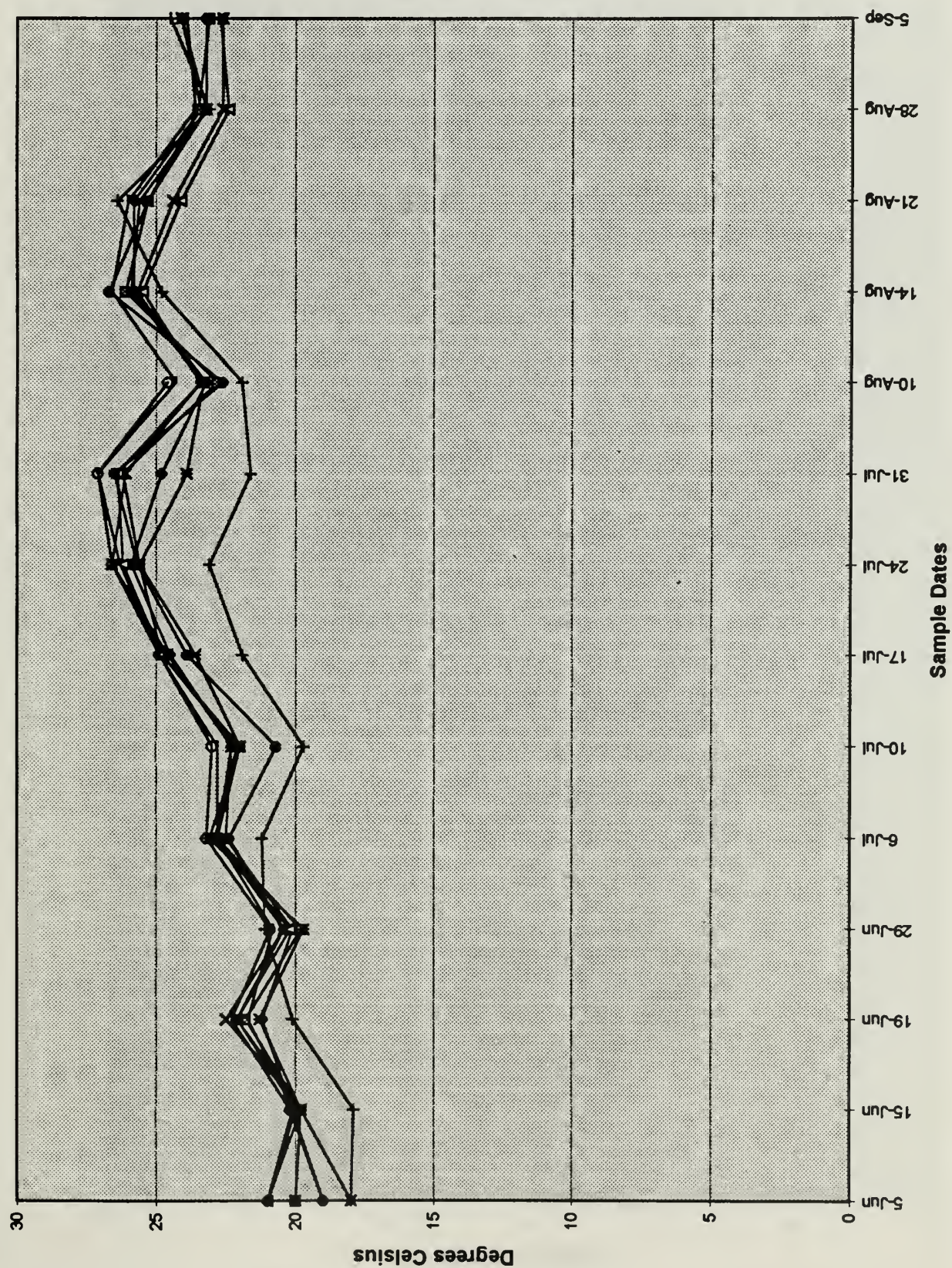
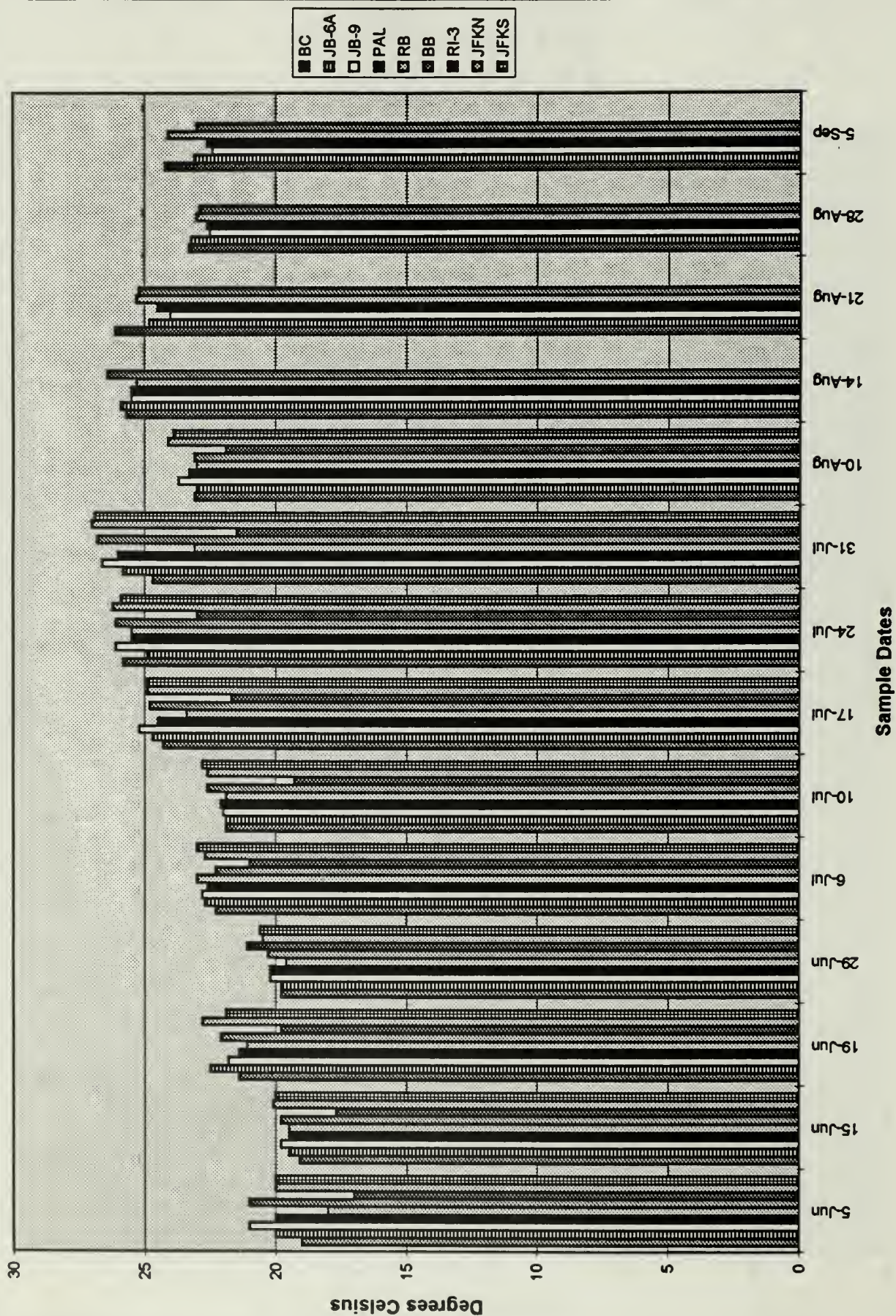


Figure 47

1995 Jamaica Bay Water Temperature: Bottom Samples



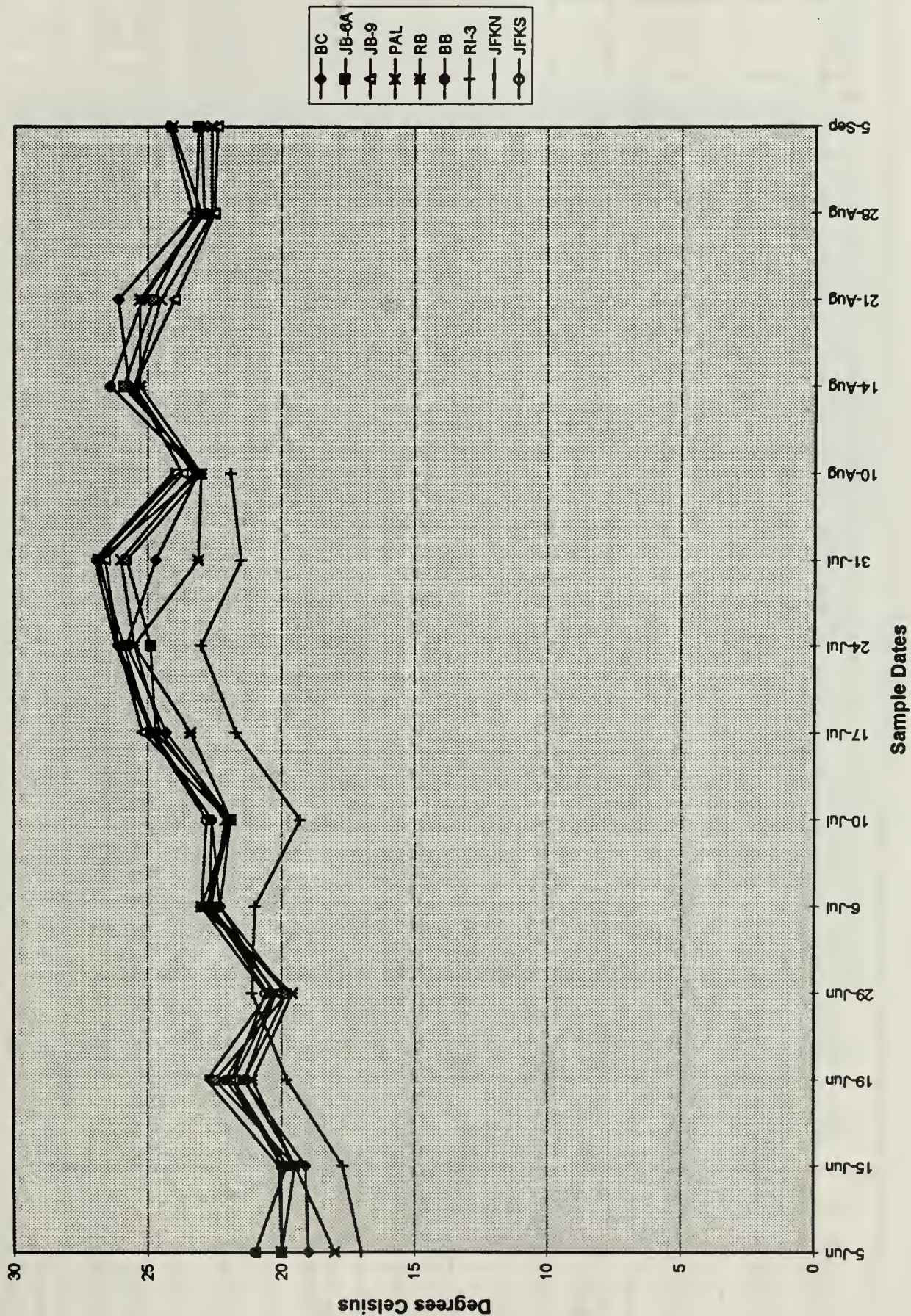


Figure 49

Table XVIII
Jamaica Bay pH
1995

Sample Location	Site	Depth	Sample Dates													
			6/05	6/15	6/19	6/29	7/06	7/10	7/17	7/24	7/31	8/10	8/14	8/21	8/28	9/05
Beach Channel	BC	Top	8.00	8.19	8.24	7.79	7.96	7.90	7.72	7.85	7.10	7.85	7.91	7.93	7.94	7.57
		Bottom	8.00	8.17	8.25	7.81	8.04	7.88	7.73	7.84	8.20	7.86	7.89	7.94	7.96	7.55
Hendrix Creek	JB-6A	Top	7.50	8.19	8.20	7.85	8.09	7.94	7.64	8.21	7.30	7.77	7.61	7.93	7.49	7.26
		Bottom	7.70	8.14	8.24	7.82	8.05	7.92	7.65	7.94	7.00	7.81	7.69	7.96	7.66	7.35
Bergen Basin Outflow	JB-9	Top	7.80	8.19	7.31	7.07	8.17	7.26	7.42	7.59	6.90	7.29	7.77	7.22	6.75	7.14
		Bottom	8.00	8.17	7.96	7.59	8.12	7.71	7.54	7.91	7.30	7.59	7.81	8.07	7.71	7.46
Ruffle Bar	RB	Top	7.90	8.12	8.30	7.86	8.17	7.92	7.74	7.91	7.30	7.91	7.91	8.16	7.95	7.52
		Bottom	7.50	8.00	8.27	7.84	8.08	7.91	7.75	7.91	8.10	7.94	7.90	8.16	7.90	7.59
Pennsylvania Avenue Landfill	PAL	Top	8.40	8.18	8.30	7.71	8.35	7.73	7.52	8.34	7.20	7.70	7.83	8.21	7.74	7.64
		Bottom	7.70	8.11	8.24	7.75	8.11	7.77	7.57	7.97	6.80	7.69	7.74	8.10	7.75	7.49
Bergen Basin	BB	Top	7.20	7.12	7.05	7.09	7.12	7.16	6.96	7.44	7.30	7.30	7.80	7.86	7.78	7.64
		Bottom	7.80	8.00	7.86	7.66	7.67	7.51	7.29	7.88	7.70	7.53	7.77	7.85	7.77	7.57
Rockaway Inlet	RI-3	Top	8.40	7.88	7.88	7.58	7.80	7.78	7.68	7.88	7.80	7.76	7.88	8.22	8.02	8.06
		Bottom	8.10	7.93	7.95	7.73	7.88	7.72	7.72	7.98	7.50	7.91	N/D	N/D	N/D	N/D
JFK North of Runway Extension	JFKN	Top	8.10	8.20	7.86	7.90	8.16	8.13	7.81	8.34	7.00	7.75	8.08	8.13	7.80	7.92
		Bottom	7.20	7.88	8.09	7.92	8.17	7.92	7.79	8.09	7.40	7.62	N/D	N/D	N/D	N/D
JFK South of Runway Extension	JFKS	Top	8.00	8.32	8.24	7.99	8.25	7.79	7.81	8.10	8.80	7.90	N/D	N/D	N/D	N/D
		Bottom	7.90	8.33	8.14	7.77	8.21	7.76	7.75	7.72	8.50	7.71	N/D	N/D	N/D	N/D

N/D: No Data.

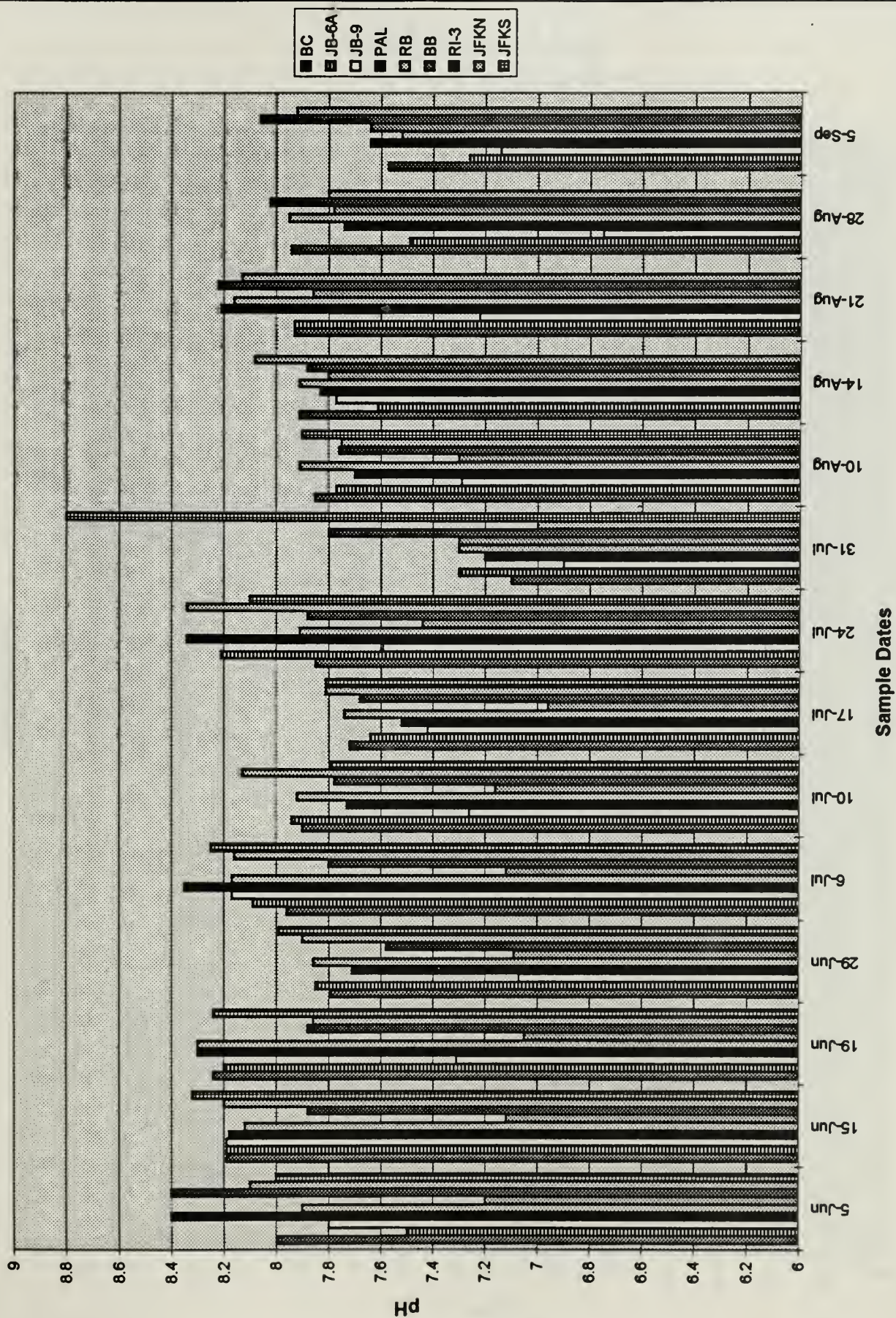
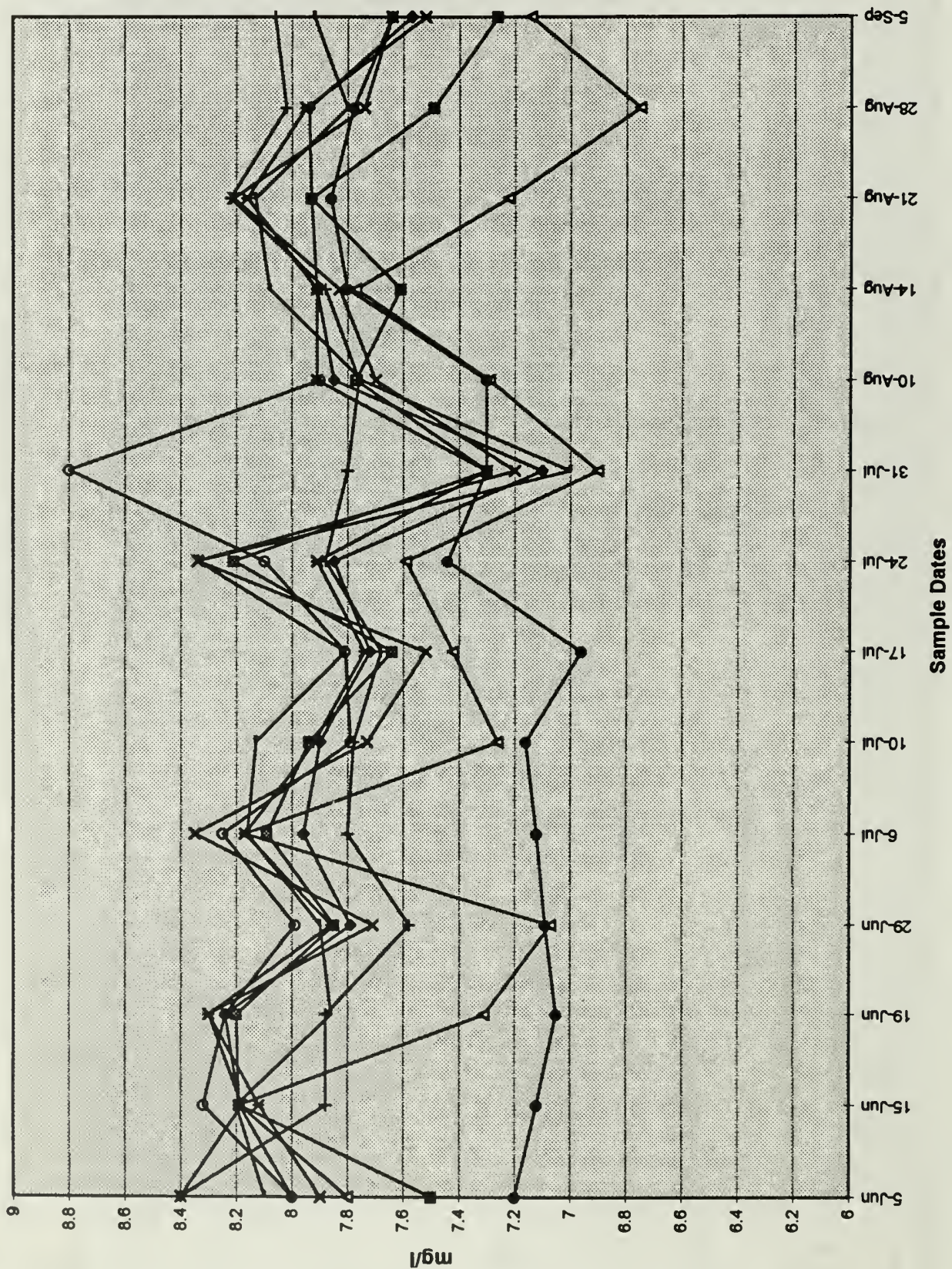


Figure 50

Jamaica Bay pH: Top Samples



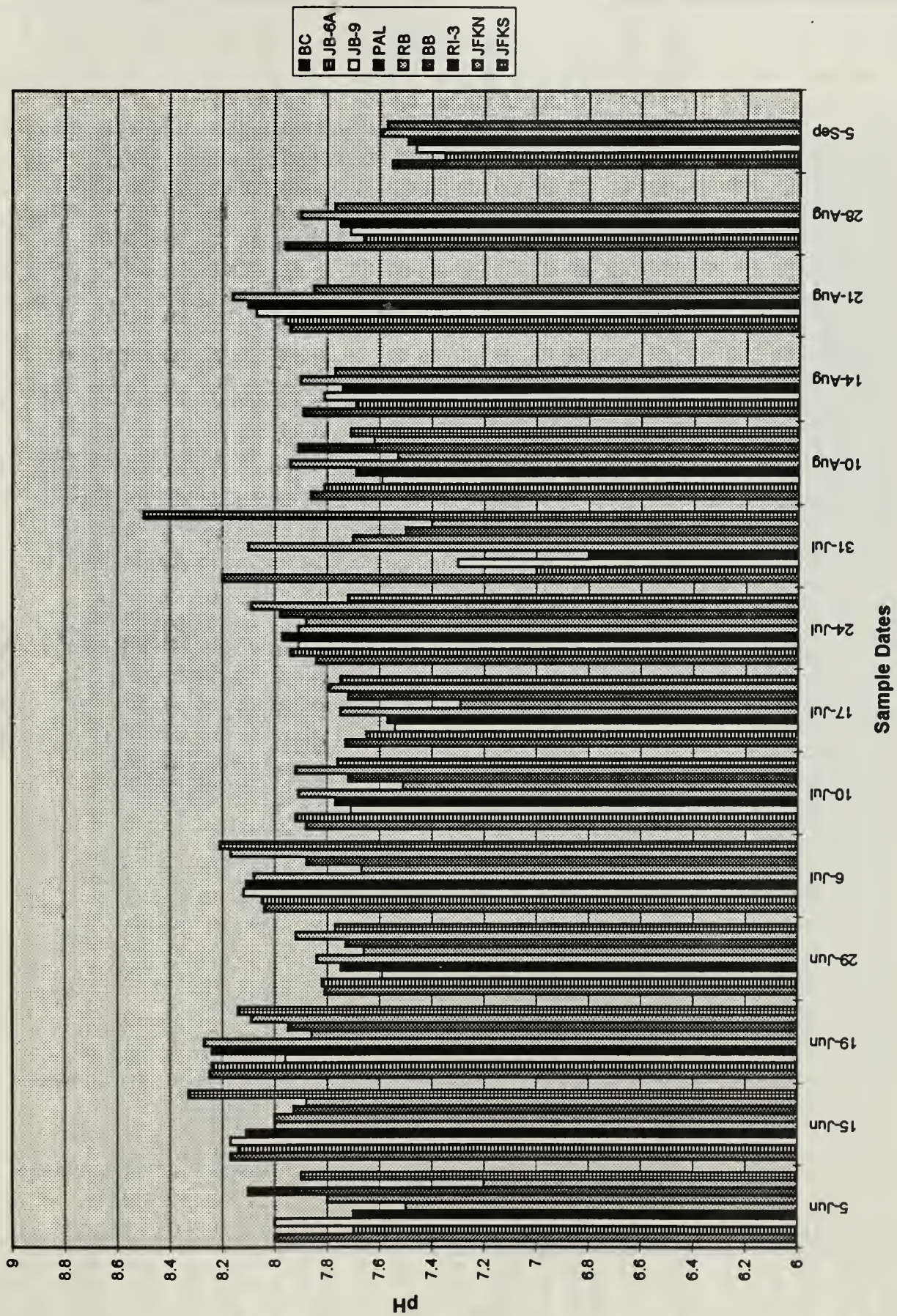
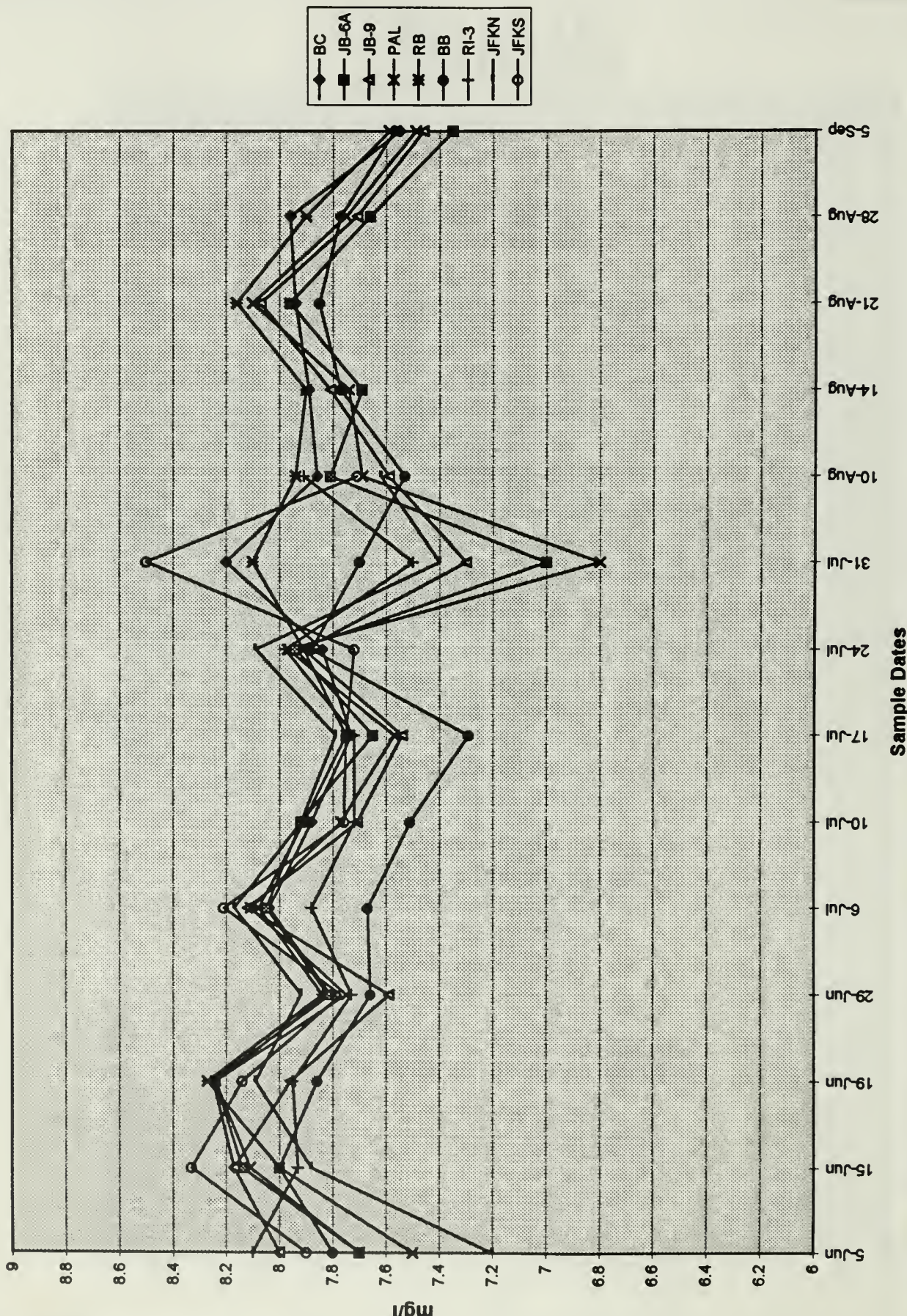


Figure 52

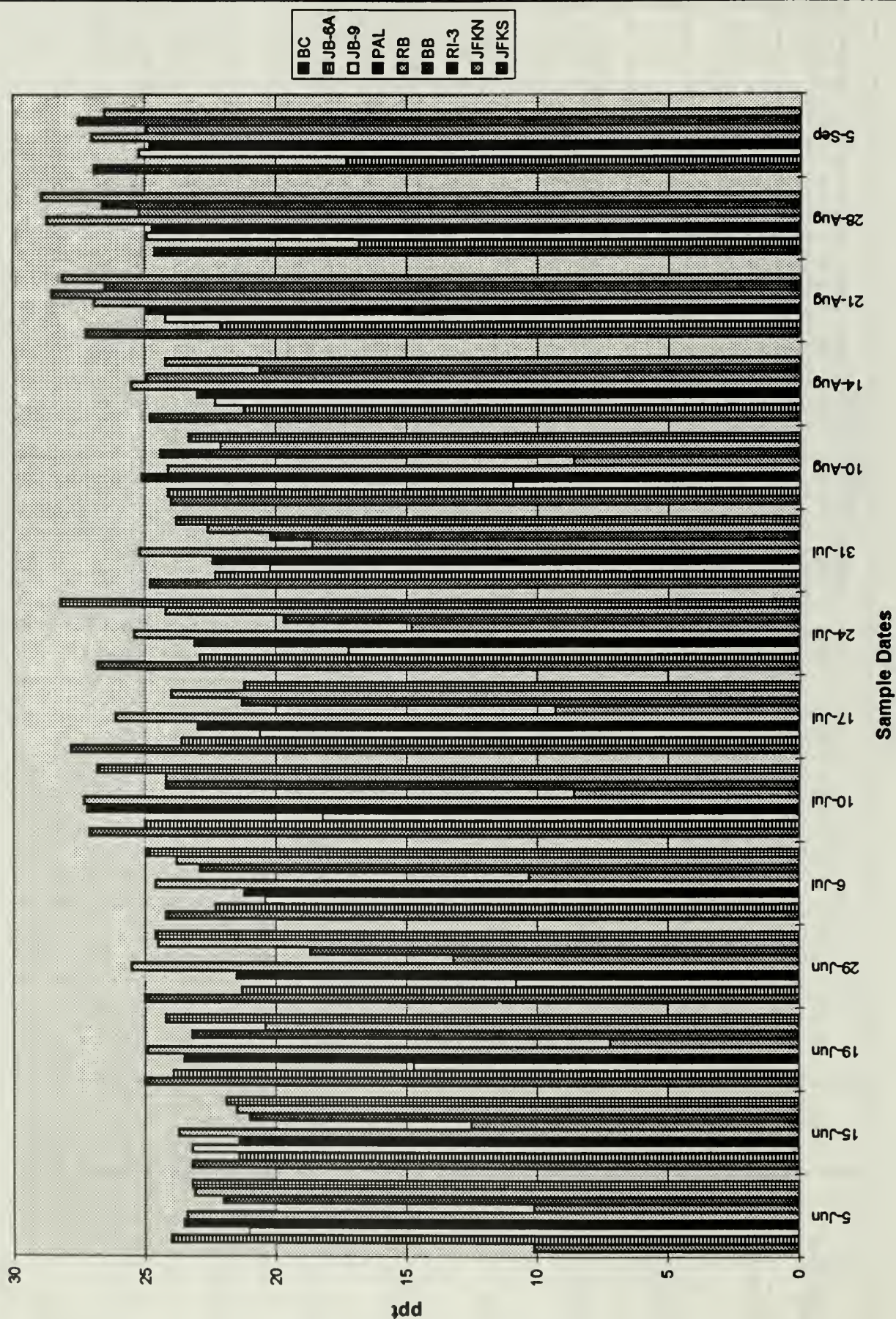
Jamaica Bay pH: Bottom Samples



Sample Location	Site	Depth	Sample Dates													
			6/05	6/15	6/19	6/29	7/06	7/10	7/17	7/24	7/31	8/10	8/14	8/21	8/28	9/05
Beach Channel	BC	Top Bottom	10.1 21.1	23.2 23.1	25.0 24.7	25.0 24.5	24.2 25.3	27.1 26.2	27.8 28.2	26.8 27.2	24.8 24.4	24.0 24.7	24.8 24.6	27.2 27.4	24.6 24.9	26.9 27.1
Hendrix Creek	JB-6A	Top Bottom	24.0 23.0	21.4 21.3	23.9 23.4	21.3 22.2	22.3 24.1	25.0 25.0	23.6 24.4	22.9 23.3	22.3 22.9	24.1 24.7	21.2 24.2	22.1 25.4	16.8 24.8	17.3 25.2
Bergen Basin Outflow	JB-9	Top Bottom	21.0 22.5	23.2 23.1	14.7 23.4	10.8 23.5	20.4 23.9	18.2 25.9	20.6 23.6	17.2 24.1	20.2 23.5	10.9 20.9	22.3 21.7	24.2 24.7	24.9 25.2	25.2 25.4
Ruffle Bar	RB	Top Bottom	23.4 23.5	23.7 23.7	24.9 24.5	25.5 25.6	24.6 27.4	27.3 27.5	26.1 26.2	25.4 24.8	25.2 25.0	24.1 21.8	25.5 25.2	26.9 26.7	28.7 28.5	27.0 27.1
Pennsylvania Avenue Landfill	PAL	Top Bottom	23.5 21.0	21.4 21.0	23.5 24.4	21.5 23.4	21.2 22.6	27.2 27.4	23.0 22.8	23.1 19.7	22.4 23.1	25.1 25.8	23.0 22.7	24.9 25.2	24.7 24.7	24.8 25.2
Bergen Basin	BB	Top Bottom	10.1 21.1	12.5 21.4	7.2 22.5	13.2 20.2	10.3 22.6	8.6 25.2	9.3 23.8	14.8 23.3	18.6 22.5	8.6 24.1	24.9 24.1	28.5 28.6	25.2 24.9	24.9 24.2
Rockaway Inlet	RI-3	Top Bottom	22.0 23.0	21.0 21.5	23.2 23.9	18.7 20.2	22.9 20.7	24.2 25.2	21.3 25.2	19.7 20.1	20.2 22.2	24.4 24.9	20.6 N/D	26.5 N/D	26.6 N/D	27.5 N/D
JFK North of Runway Extension	JFKN	Top Bottom	23.1 23.2	21.5 22.0	20.4 23.2	24.5 24.2	23.8 24.5	24.2 25.9	24.0 23.8	24.2 24.8	22.6 22.8	22.1 21.7	24.2 N/D	28.1 N/D	28.9 N/D	26.5 N/D
JFK South of Runway Extension	JFKS	Top Bottom	23.2 23.9	21.9 21.7	24.2 23.8	24.6 24.1	24.9 25.2	26.8 25.9	21.2 24.8	28.2 27.4	23.8 24.8	23.3 23.4	N/D N/D	N/D N/D	N/D N/D	N/D N/D

N/D: No Data.

Figure 1 is a horizontal bar chart showing the concentration of various pesticides in p.p.t. (parts per thousand) for different sample dates from June 5 to September 5. The y-axis represents the concentration in p.p.t., ranging from 0 to 30. The x-axis represents the sample dates. The legend identifies the pesticides: BC (solid black), JB-6A (white), JB-9 (horizontal lines), PAL (vertical lines), RB (cross-hatch), BB (solid grey), RI-3 (diagonal lines), JFKN (dotted), and JFKS (fine grid). The chart shows that most pesticides are present in concentrations between 10 and 25 p.p.t., with some variation over time.



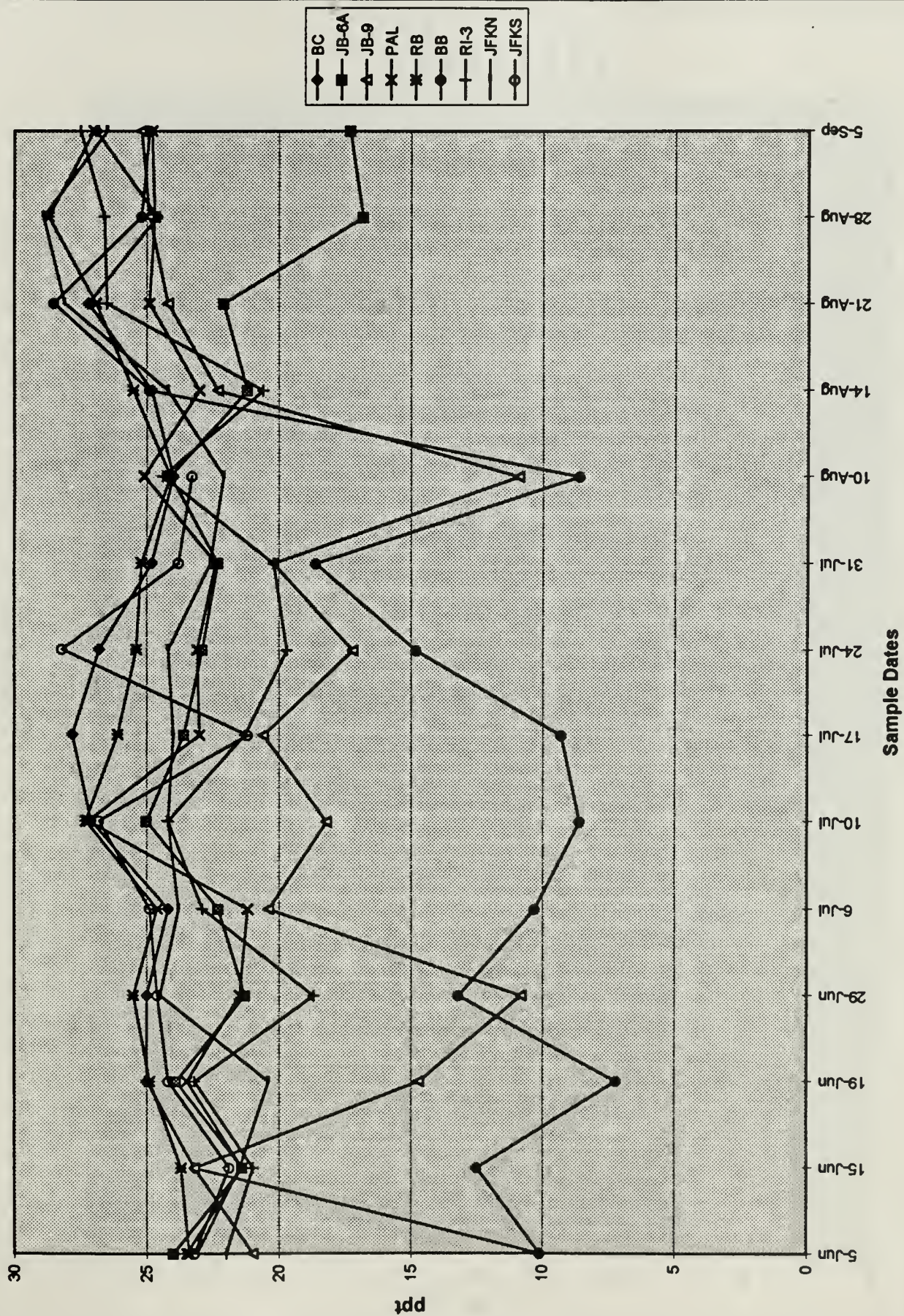
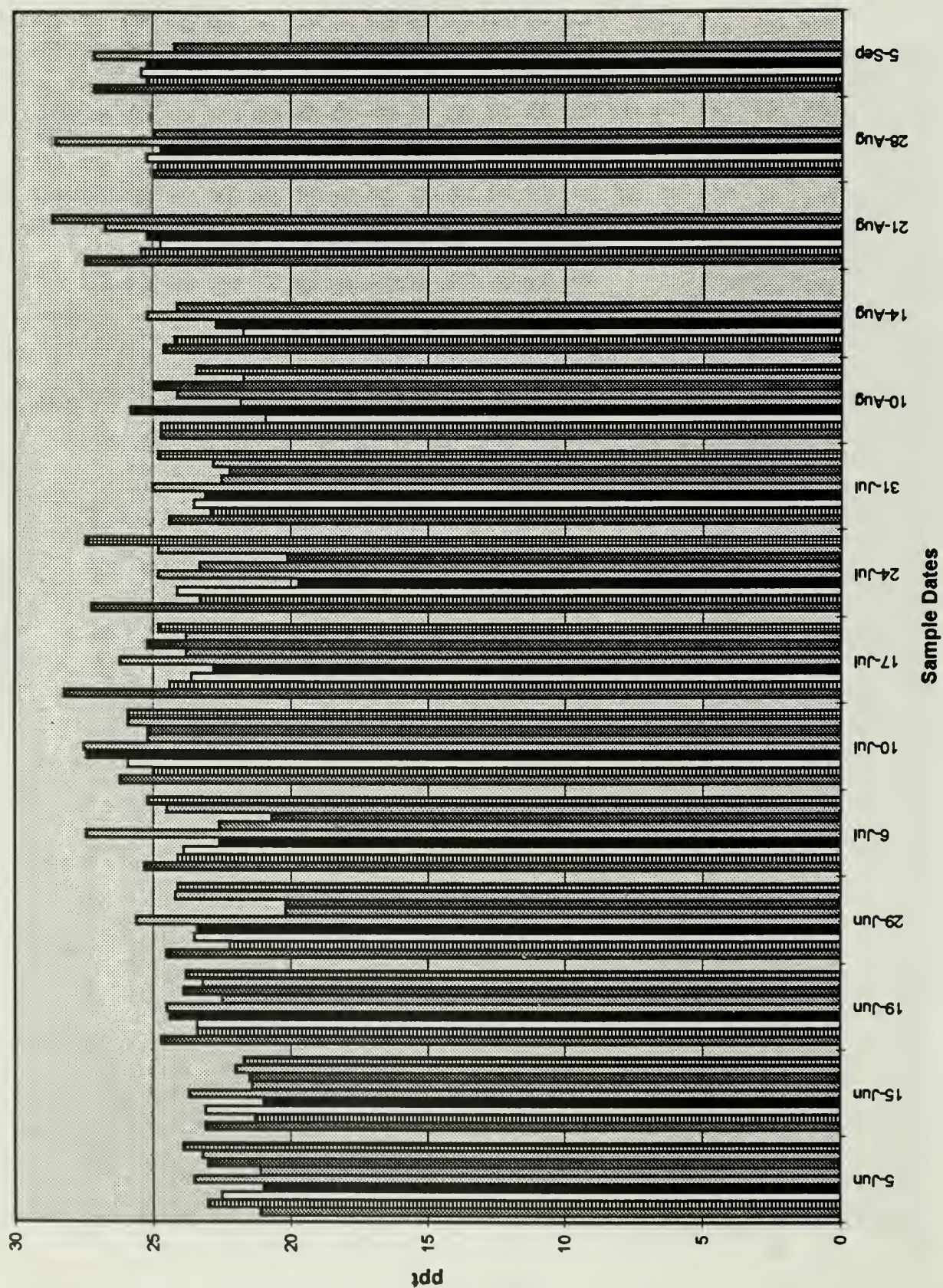


Figure 55

☒ BC
☐ JB-6A
☐ JB-9
☒ PAL
☒ RB
☒ BB
☒ RI-3
☒ JFKN
☒ JFKS



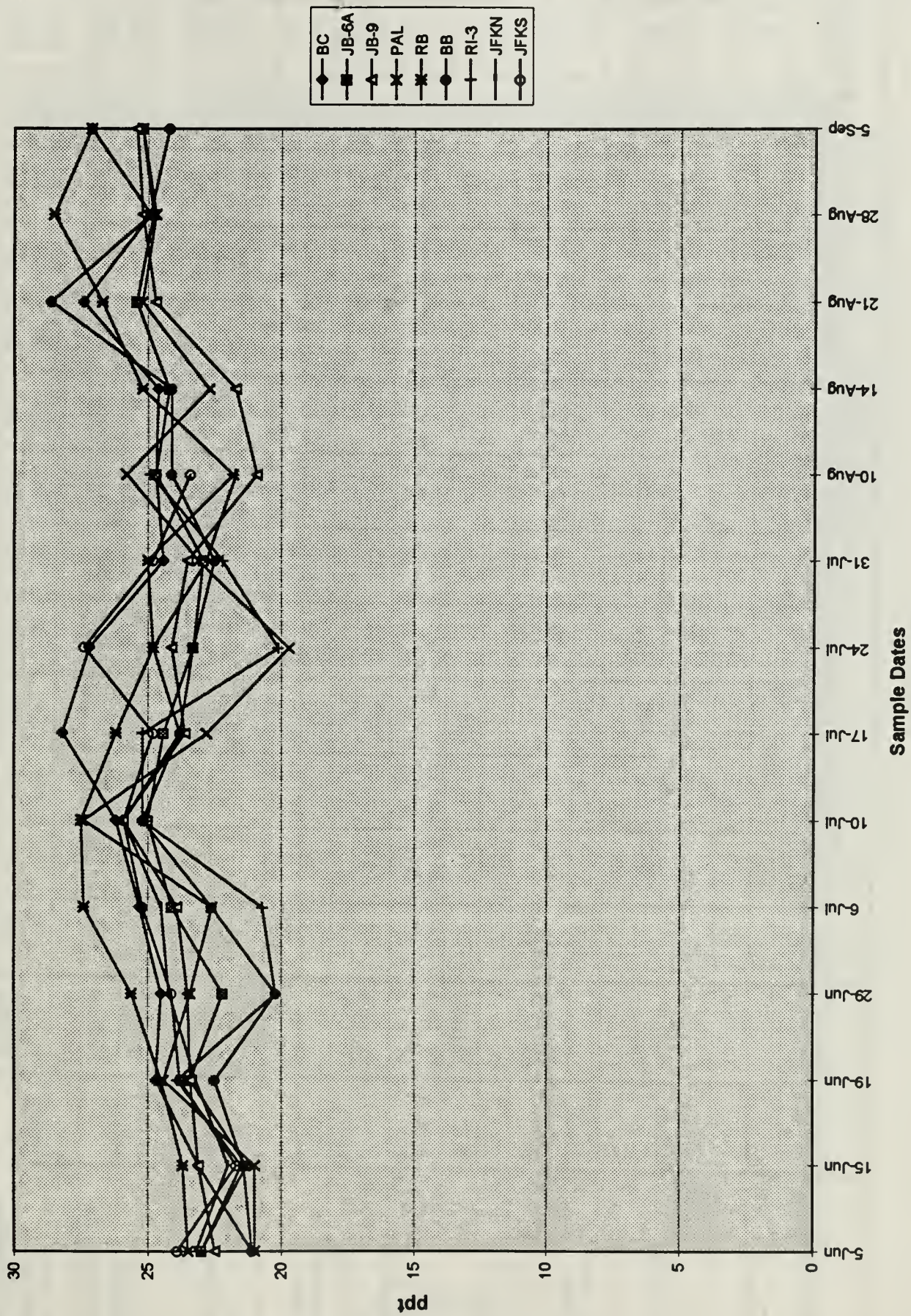


Figure 57

Table XX
Jamaica Bay Conductivity (mmho/cm)
1995

Sample Location	Site	Depth	Sample Dates													
			6/05	6/15	6/19	6/29	7/06	7/10	7/17	7/24	7/31	8/10	8/14	8/21	8/28	9/05
Beach Channel	BC	Top Bottom	320 316	339 332	364 360	347 342	352 368	361 358	390 390	390 395	390 392	362 352	392 387	405 407	378 370	398 400
Hendrix Creek	JB-6A	Top Bottom	321 310	311 308	340 344	308 322	334 350	345 348	361 372	348 358	364 368	363 370	321 368	348 392	262 378	269 382
Bergen Basin Outflow	JB-9	Top Bottom	288 310	252 314	228 347	157 322	307 350	248 347	325 370	265 375	322 374	178 341	352 349	372 377	377 380	381 379
Ruffle Bar	RB	Top Bottom	320 321	341 341	365 361	354 352	360 322	362 367	392 394	397 405	397 392	369 332	405 392	400 404	405 405	401 407
Pennsylvania Avenue Landfill	PAL	Top Bottom	320 311	311 307	354 355	313 322	312 331	343 348	353 352	340 300	362 370	358 364	352 354	379 385	372 377	374 380
Bergen Basin	BB	Top Bottom	143 290	185 300	124 337	183 283	156 331	122 337	150 359	285 362	308 368	127 349	385 375	396 401	388 382	379 334
Rockaway Inlet	RI-3	Top Bottom	290 310	302 300	332 338	282 291	339 304	342 354	320 372	316 319	309 328	360 365	334 N/D	402 N/D	407 N/D	401 N/D
JFK North of Runway Extension	JFKN	Top Bottom	318 318	312 319	338 294	340 335	349 345	328 347	371 371	348 350	375 380	342 333	382 N/D	405 N/D	392 N/D	395 N/D
JFK South of Runway Extension	JFKS	Top Bottom	318 320	315 319	362 359	342 332	363 366	361 360	332 338	385 385	389 385	355 354	N/D N/D	N/D N/D	N/D N/D	N/D N/D

N/D: No Data.

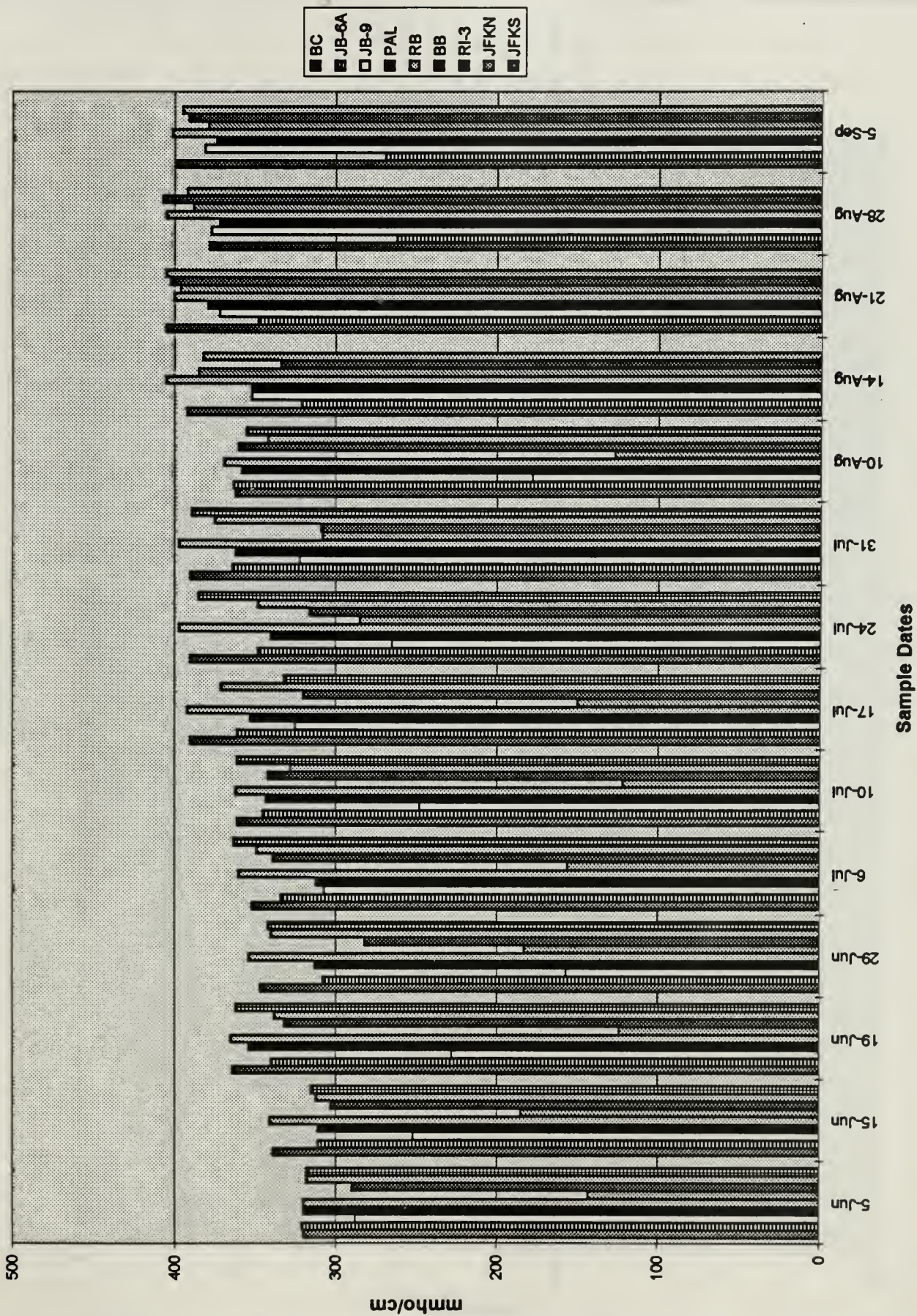
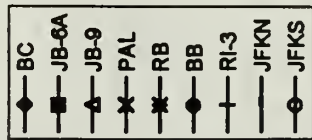


Figure 58

The graph displays salinity data for various stations in 1966. The y-axis represents salinity in mmho/cm, ranging from 0 to 500. The x-axis represents sample dates from June 5 to September 5. Multiple lines, each representing a different station, show the temporal variation of salinity. Most stations maintain salinity levels between 300 and 450 mmho/cm, with some stations showing a significant decrease in salinity (increasing conductivity) starting in late July and peaking in early August.



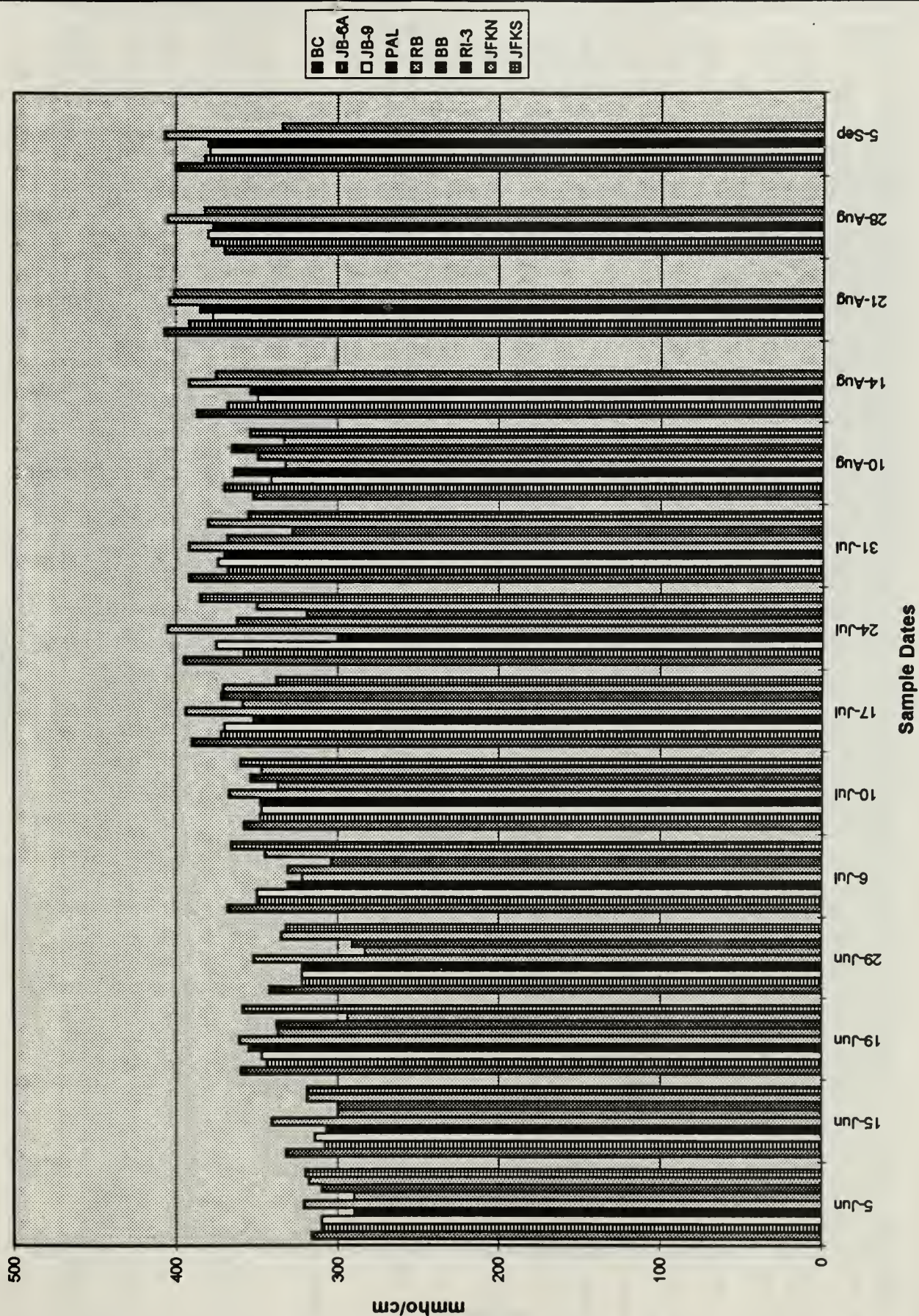
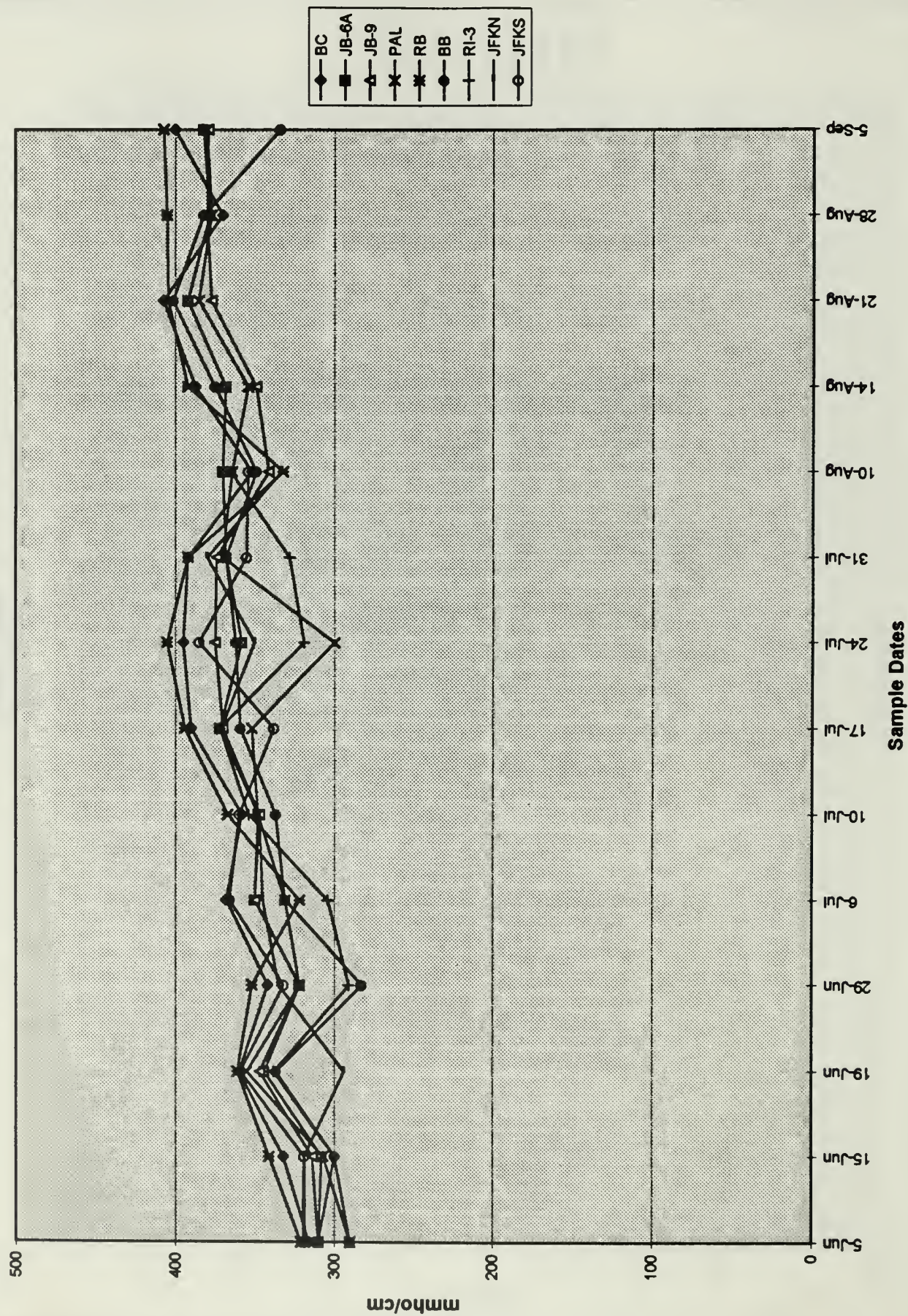


Figure 60

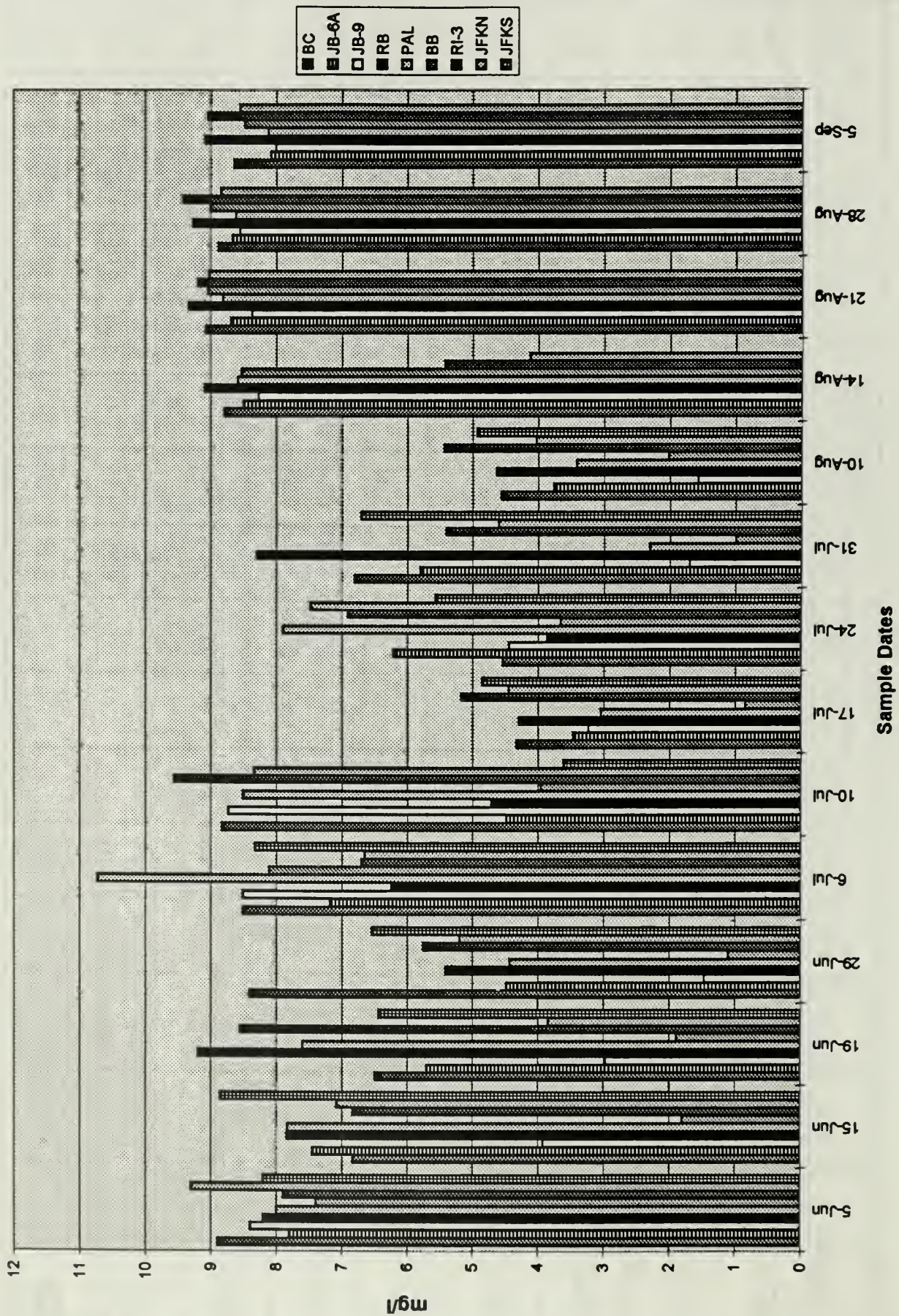
1995 Jamaica Bay Conductivity: Bottom Samples



Sample Location	Site	Depth	Sample Dates													
			6/05	6/15	6/19	6/29	7/06	7/10	7/17	7/24	7/31	8/10	8/14	8/21	8/28	9/05
each Channel	BC	Top	8.90	6.83	6.49	8.41	8.51	8.83	4.33	4.54	6.80	4.56	8.79	9.07	8.88	8.64
		Bottom	8.40	7.70	5.68	5.42	8.58	8.46	3.45	3.64	7.90	5.13	8.86	8.93	8.85	8.77
endrix Creek	JB-6A	Top	7.80	7.45	5.70	4.48	7.18	4.48	3.46	6.21	5.80	3.76	8.50	8.69	8.67	8.08
		Bottom	7.80	7.42	5.33	3.87	5.52	8.62	3.72	3.72	6.30	4.09	3.84	8.80	8.77	8.15
ergen Basin outflow	JB-9	Top	8.40	3.92	2.96	1.47	8.51	8.73	3.23	4.44	1.70	1.57	8.27	8.37	8.55	8.01
		Bottom	8.50	4.58	4.18	3.80	6.29	8.54	2.85	3.96	3.90	4.24	4.12	8.24	8.57	8.06
uffle Bar	RB	Top	8.20	7.84	9.19	5.41	6.24	4.71	4.29	3.86	8.30	4.63	9.09	9.33	9.26	9.08
		Bottom	8.00	6.03	7.67	4.83	4.95	4.52	4.31	4.45	6.90	5.43	9.31	9.26	9.13	9.16
ennsylvania Avenue andfill	PAL	Top	8.00	7.83	7.60	4.43	10.72	8.51	3.04	7.90	2.30	3.41	8.59	8.81	8.62	8.12
		Bottom	7.80	7.45	5.44	4.57	5.93	8.48	3.34	4.08	4.80	3.38	4.26	8.74	8.66	8.09
ergen Basin	BB	Top	7.40	1.80	1.89	1.10	8.11	3.96	0.85	3.66	1.00	2.02	8.53	9.04	9.00	8.48
		Bottom	7.90	5.80	3.36	3.91	3.96	2.42	1.56	3.41	3.70	2.95	4.80	9.25	8.78	8.34
ockaway Inlet	RI-3	Top	7.90	6.83	8.55	5.75	6.70	9.55	5.17	6.91	5.40	5.43	5.42	9.19	9.41	9.04
		Bottom	8.90	6.89	7.41	4.64	4.90	5.33	9.00	5.70	5.70	5.32	N/D	N/D	N/D	N/D
FK North of unway Extension	JFKN	Top	9.30	7.08	3.84	5.20	6.65	8.34	4.45	7.48	4.60	4.03	4.12	9.02	8.84	8.55
		Bottom	2.30	4.40	3.99	4.90	5.55	8.36	3.82	4.42	5.30	2.71	N/D	N/D	N/D	N/D
FK South of unway Extension	JFKS	Top	8.20	8.86	6.43	6.53	8.33	3.61	4.85	5.57	6.70	4.93	N/D	N/D	N/D	N/D
		Bottom	8.10	7.18	4.56	4.26	7.21	6.17	4.14	2.38	5.80	4.19	N/D	N/D	N/D	N/D

D: No Data.

Jamaica Bay Dissolved Oxygen: Top Samples



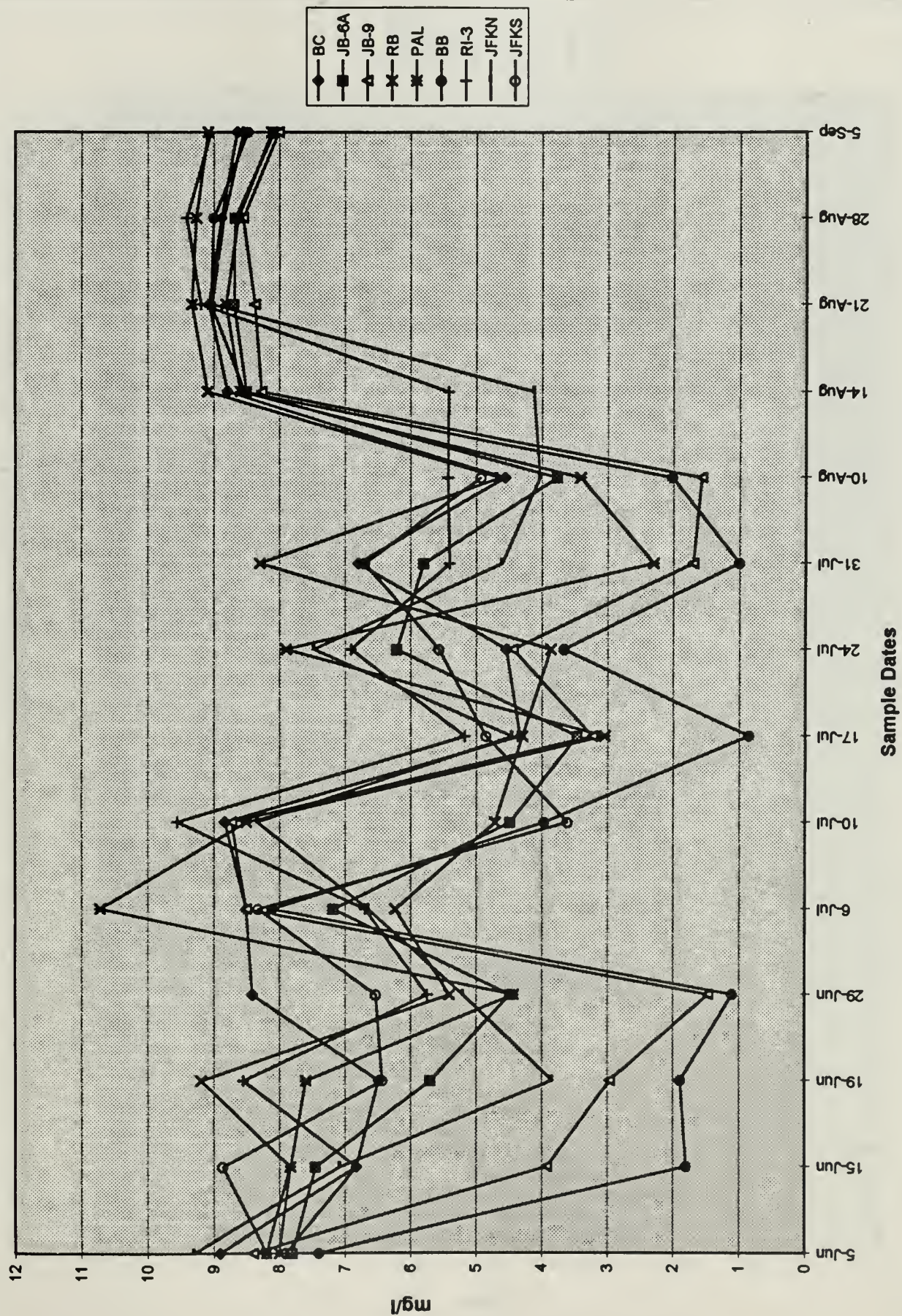
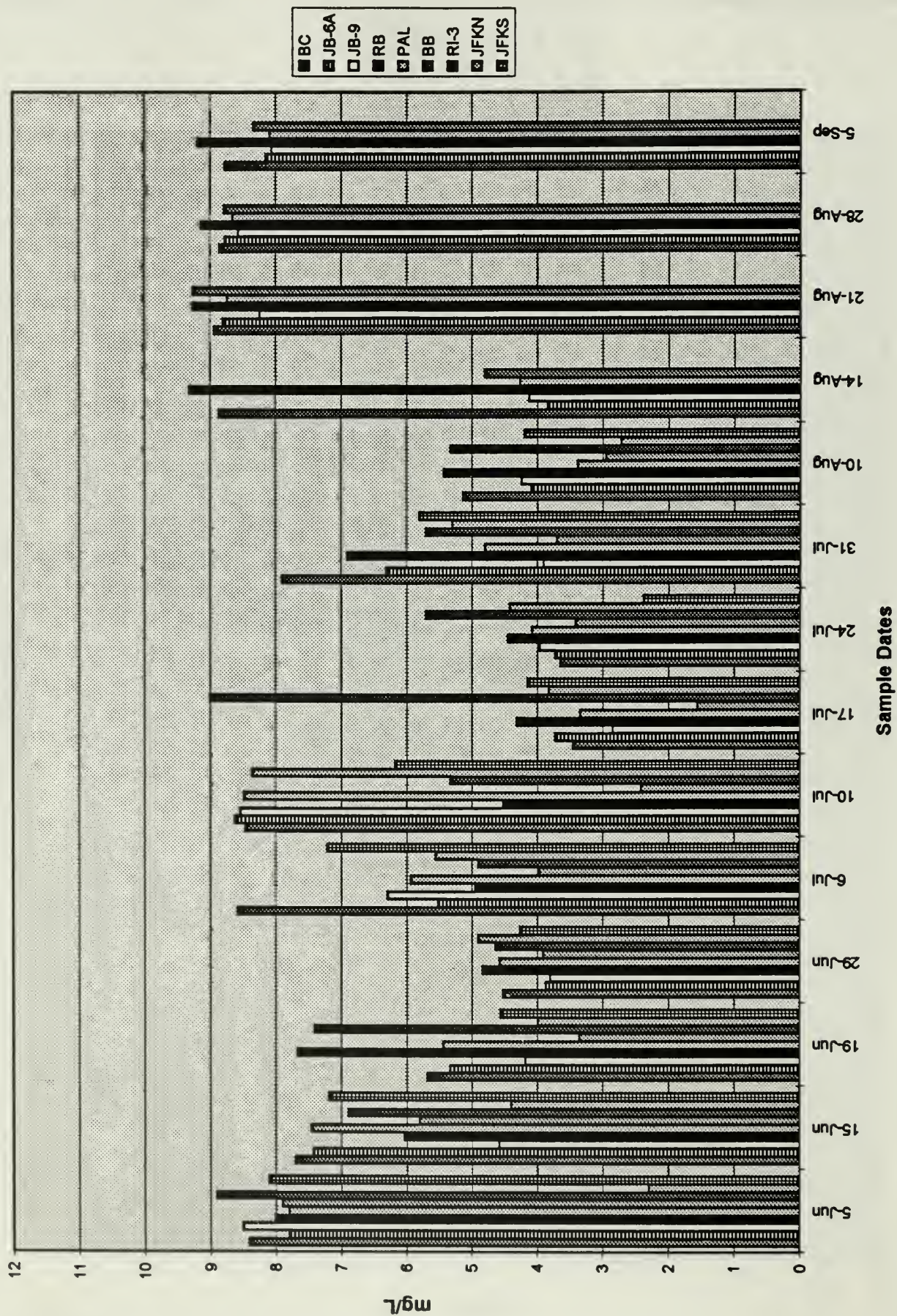


Figure 63

Jamaica Bay Dissolved Oxygen Readings: Bottom Samples



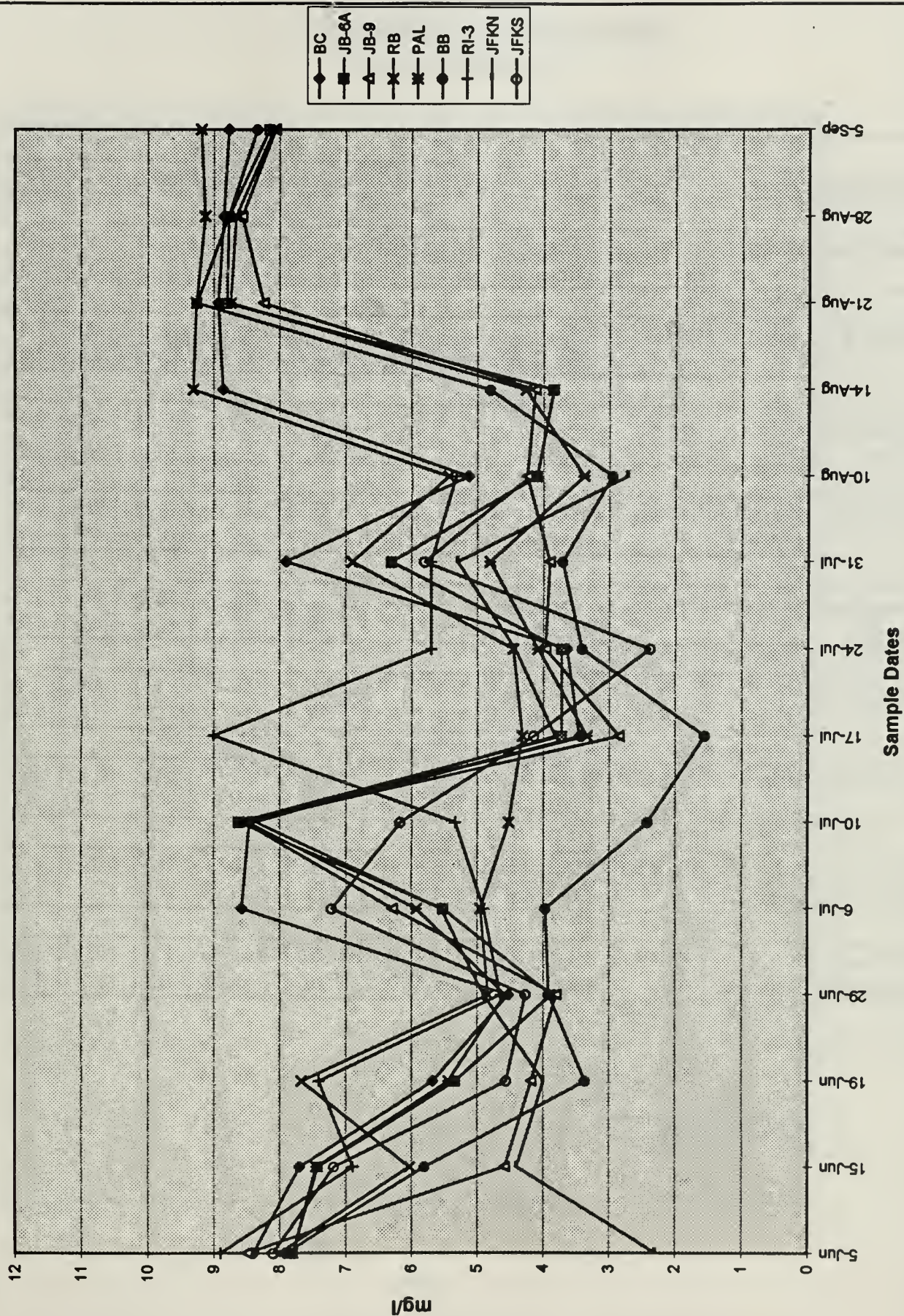


Figure 65

Table XXII
Jamaica Bay Nitrates (mg/l)
1995

Sample Location	Site	Depth	Sample Dates						
			6/15	6/29	7/10	7/24	8/10	8/21	9/05
Beach Channel	BC	Top	<0.1	0.20	0.27	0.26	0.15	0.25	0.37
		Bottom	<0.1	0.18	0.28	0.22	0.14	0.28	0.37
Hendrix Creek	JB-6A	Top	0.11	0.17	0.23	0.25	0.13	0.28	0.50
		Bottom	<0.1	0.16	0.18	0.22	0.12	0.22	0.50
Bergen Basin Outflow	JB-9	Top	0.14	<0.1	<0.1	<0.1	<0.1	0.26	0.44
		Bottom	0.21	<0.1	0.25	0.27	0.17	0.25	0.46
Ruffle Bar	RB	Top	<0.1	0.12	0.21	0.24	0.14	0.13	0.35
		Bottom	<0.1	0.10	0.22	0.23	0.10	0.13	0.35
Pennsylvania Avenue Landfill	PAL	Top	0.16	<0.1	0.22	0.23	0.15	0.60	2.90
		Bottom	0.16	<0.1	0.25	0.27	0.16	0.50	0.44
Bergen Basin	BB	Top	<0.1	<0.1	<0.1	0.10	<0.1	0.24	0.41
		Bottom	<0.1	0.12	<0.1	0.16	0.12	0.33	0.40
Rockaway Inlet	RI-3	Top	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		Bottom	<0.1	<0.1	<0.1	<0.1	<0.1	N/D	N/D
JFK North of Runway Extension	JFKN	Top	0.18	<0.1	0.21	0.20	0.10	0.21	0.34
		Bottom	0.14	<0.1	<0.1	0.17	0.10	N/D	N/D
JFK South of Runway Extension	JFKS	Top	0.21	0.12	0.25	0.25	0.15	N/D	N/D
		Bottom	0.21	0.14	0.26	0.19	0.18	N/D	N/D

N/D: No Data.

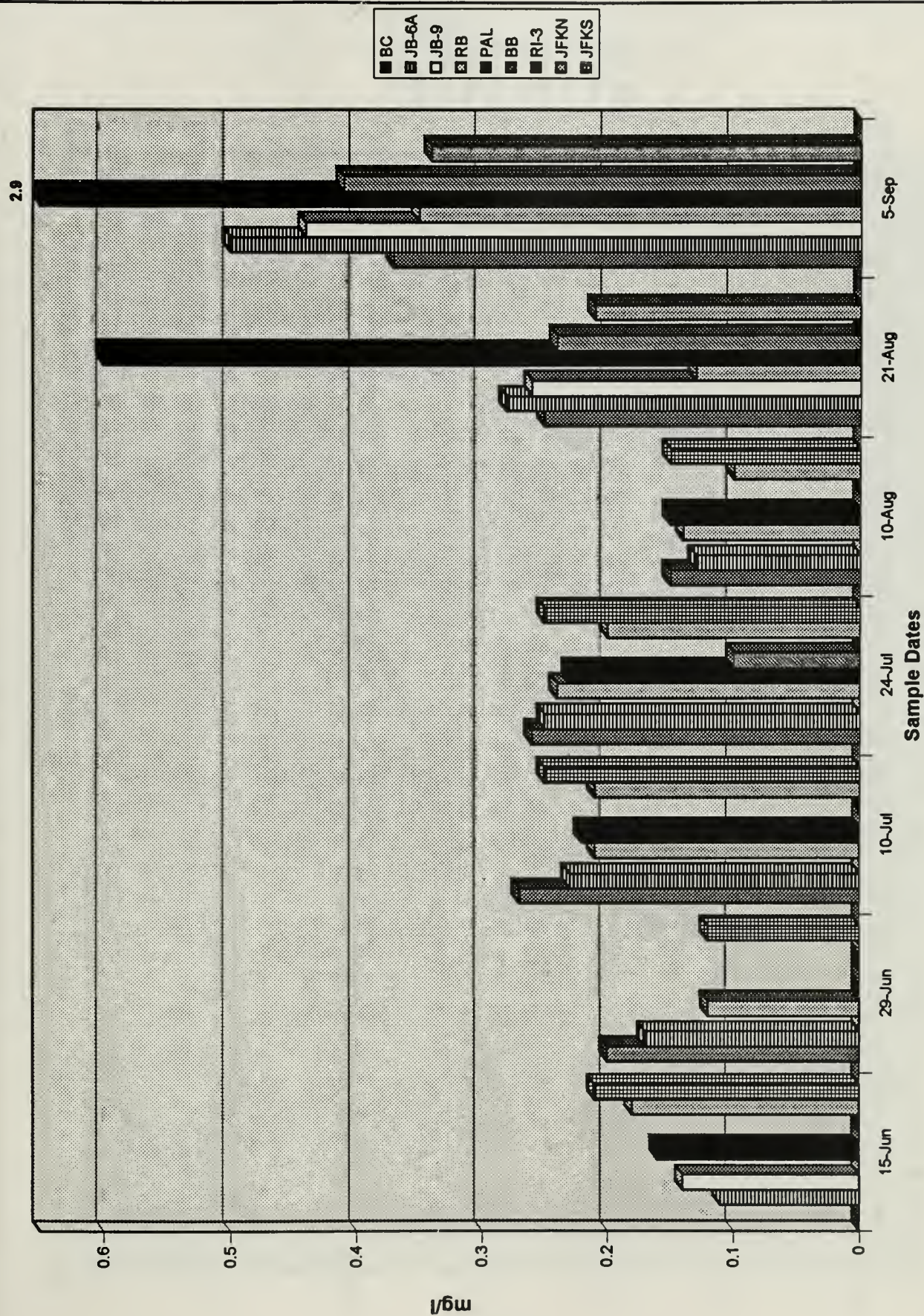
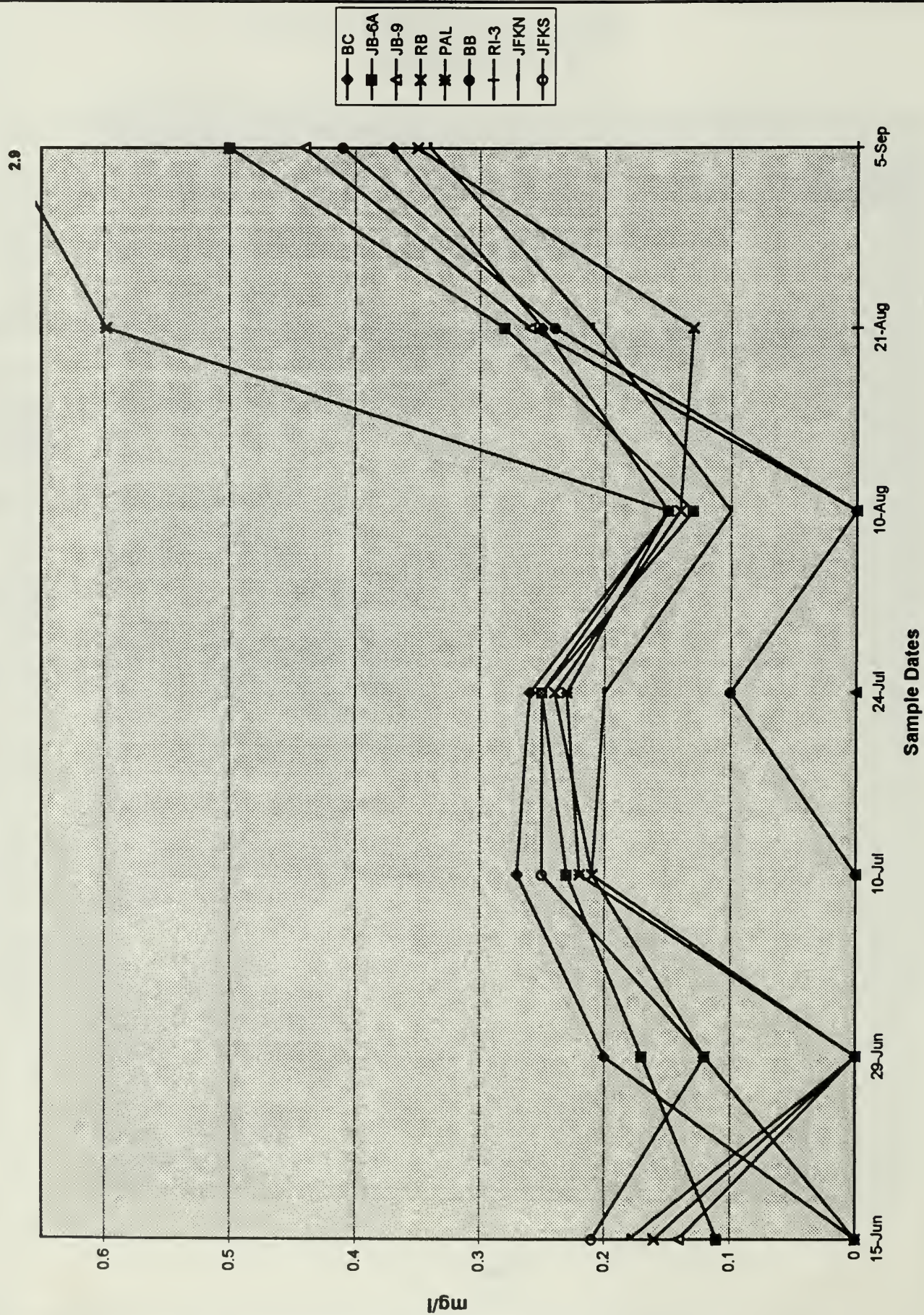


Figure 66

1995 Jamaica Bay Nitrates: Top Samples



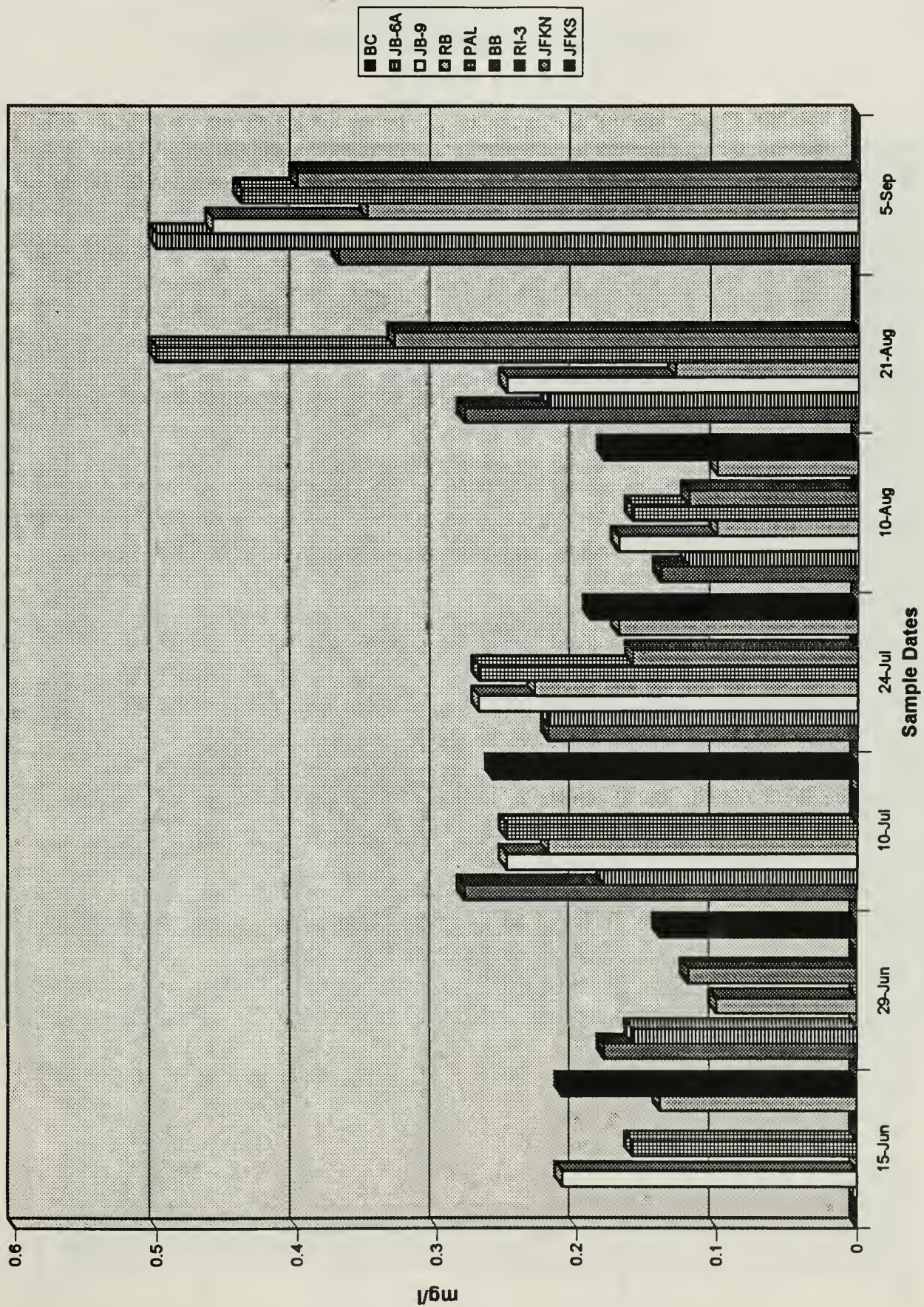


Figure 68

1995 Jamaica Bay Nitrates: Bottom Samples

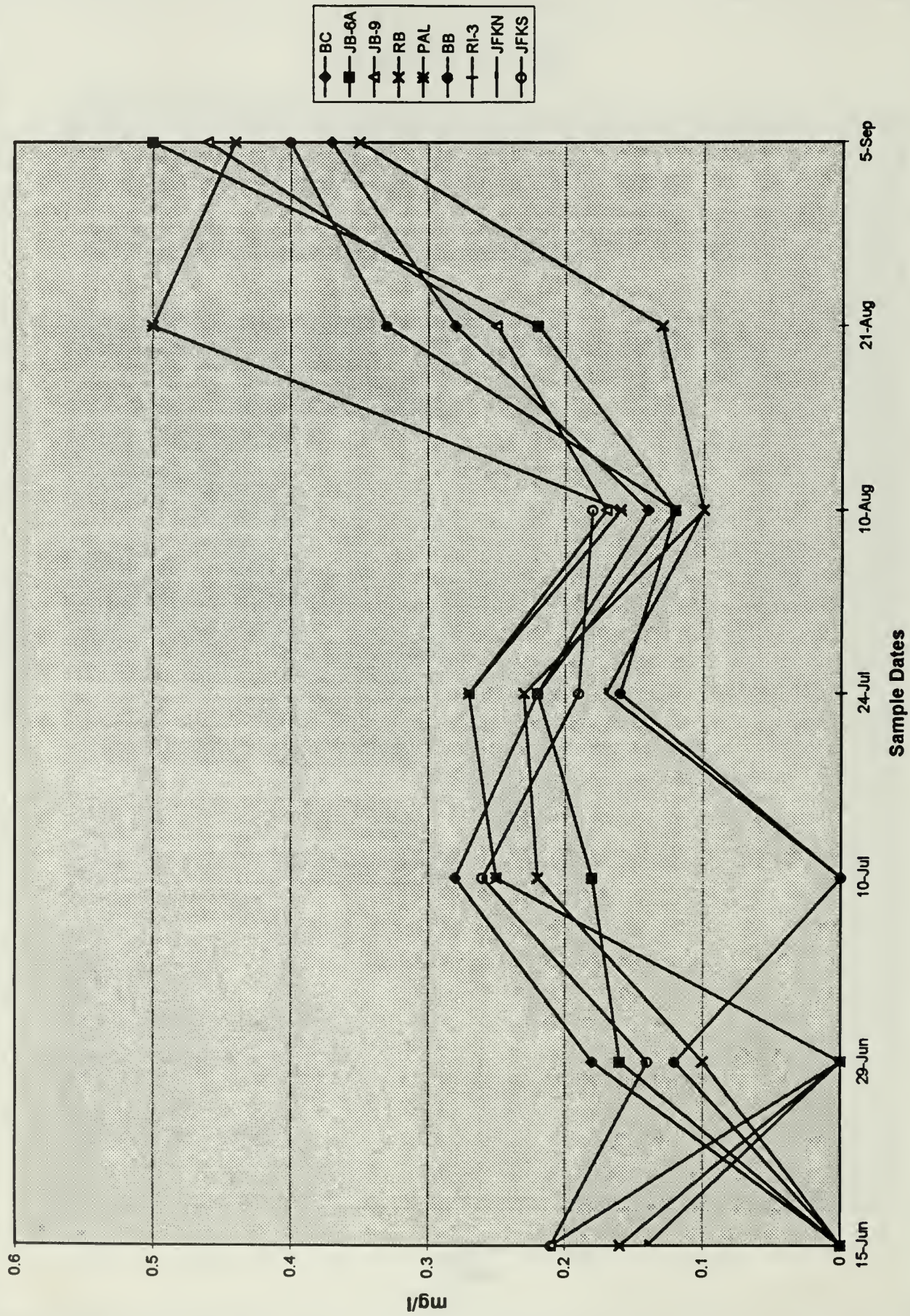


Table XXIII
Jamaica Bay Total Chlorine (mg/l)
1995

Sample Location	Site	Depth	Sample Dates						
			6/15	6/29	7/10	7/24	8/10	8/21	9/05
Beach Channel	BC	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hendrix Creek	JB-6A	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bergen Basin Outflow	JB-9	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ruffle Bar	RB	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pennsylvania Avenue Landfill	PAL	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bergen Basin	BB	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Rockaway Inlet	RI-3	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	N/D	N/D
JFK North of Runway Extension	JFKN	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	N/D	N/D
JFK South of Runway Extension	JFKS	Top	<0.5	<0.5	<0.5	<0.5	<0.5	N/D	N/D
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	N/D	N/D

N/D: No Data.

Table XXIV
Jamaica Bay Free Chlorine (mg/l)
1995

Sample Location	Site	Depth	Sample Dates						
			6/15	6/29	7/10	7/24	8/10	8/21	9/05
Beach Channel	BC	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hendrix Creek	JB-6A	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bergen Basin Outflow	JB-9	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ruffle Bar	RB	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pennsylvania Avenue Landfill	PAL	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bergen Basin	BB	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Rockaway Inlet	RI-3	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	N/D	N/D
JFK North of Runway Extension	JFKN	Top	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	N/D	N/D
JFK South of Runway Extension	JFKS	Top	<0.5	<0.5	<0.5	<0.5	<0.5	N/D	N/D
		Bottom	<0.5	<0.5	<0.5	<0.5	<0.5	N/D	N/D

N/D: No Data.

Table XXV
Jamaica Bay Phosphates (ppm)
1995

Sample Location	Site	Depth	Sample Dates						
			6/15	6/29	7/10	7/24	8/10	8/21	9/05
Beach Channel	BC	Top	0.05	0.42	0.17	0.19	0.10	0.19	0.21
		Bottom	0.05	0.37	0.14	0.18	0.50	0.23	0.16
Hendrix Creek	JB-6A	Top	0.05	0.29	0.20	0.21	0.03	0.18	0.25
		Bottom	0.05	0.35	0.15	0.15	0.27	0.22	0.54
Bergen Basin Outflow	JB-9	Top	0.47	1.50	1.60	1.20	1.60	0.19	0.25
		Bottom	0.17	0.24	0.22	0.23	0.10	0.18	0.31
Ruffle Bar	RB	Top	0.63	0.12	0.31	0.16	0.06	0.13	0.26
		Bottom	0.04	0.11	0.17	0.16	0.62	0.12	0.18
Pennsylvania Avenue Landfill	PAL	Top	0.15	0.24	0.20	0.20	0.30	N/D	0.35
		Bottom	0.14	0.37	0.18	0.36	0.27	N/D	0.41
Bergen Basin	BB	Top	0.05	1.30	2.50	1.20	3.60	0.26	0.29
		Bottom	0.19	0.27	0.60	0.65	0.25	0.22	0.30
Rockaway Inlet	RI-3	Top	0.05	0.34	0.22	0.22	0.15	0.10	0.11
		Bottom	0.05	0.08	0.14	0.06	0.34	N/D	N/D
JFK North of Runway Extension	JFKN	Top	0.18	<0.1	0.28	0.20	0.62	0.22	0.34
		Bottom	0.14	<0.1	0.25	0.28	0.38	N/D	N/D
JFK South of Runway Extension	JFKS	Top	0.13	0.21	0.22	0.18	0.23	N/D	N/D
		Bottom	0.13	0.24	0.22	0.19	0.21	N/D	N/D

N/D: No Data.

1995 Jamaica Bay Phosphates: Top Samples

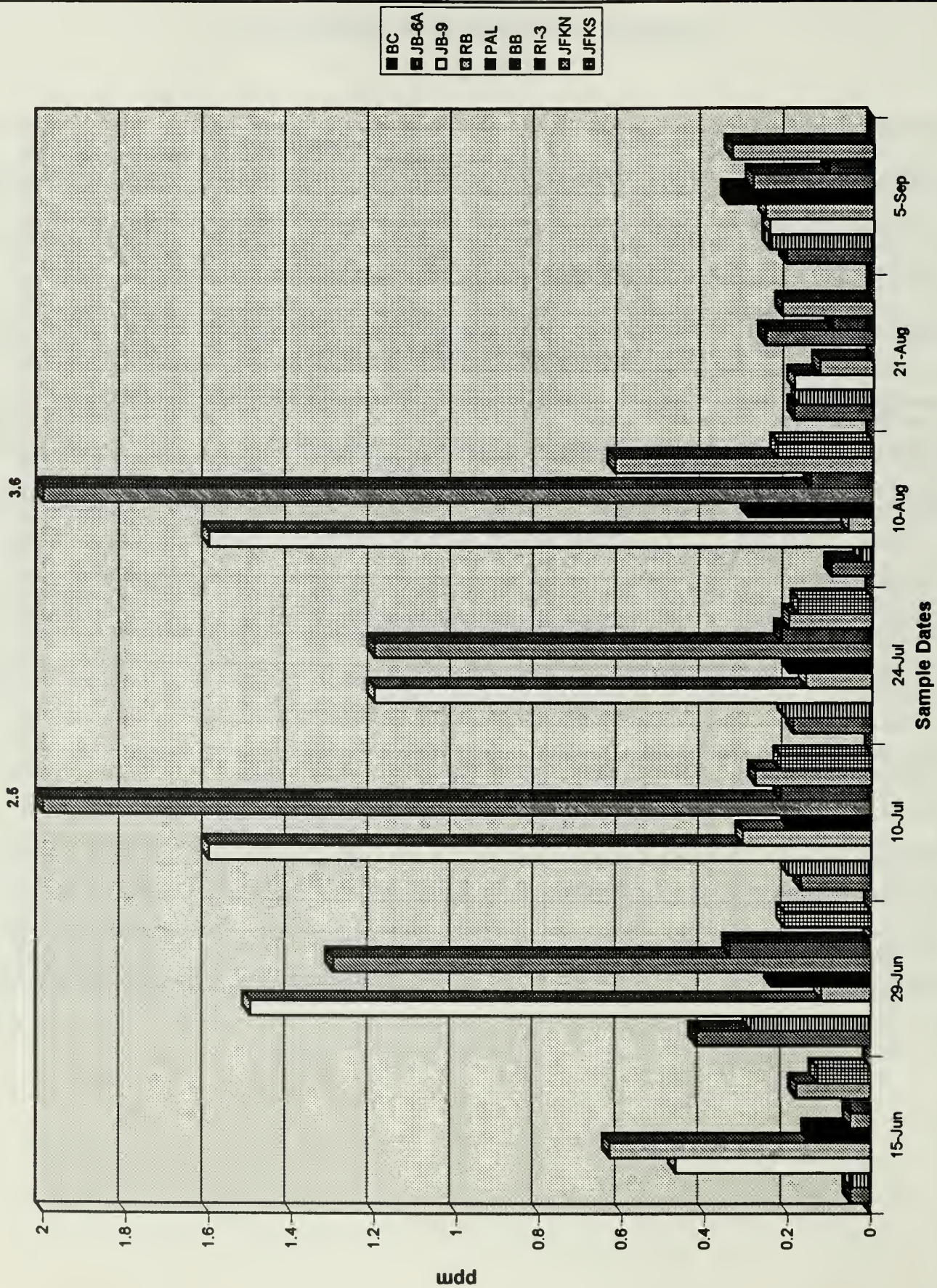


Figure 70

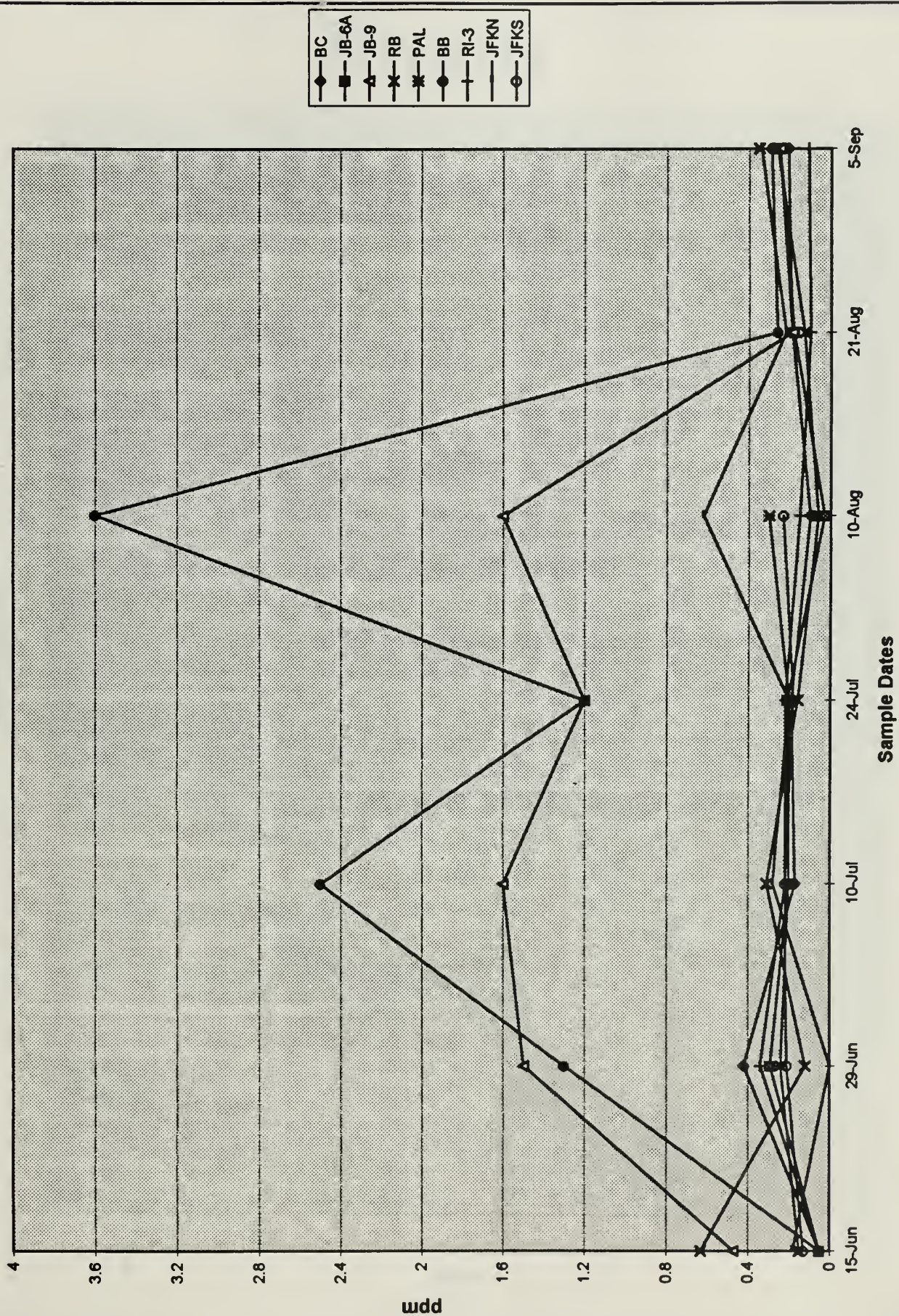


Figure 71

1995 Jamaica Bay Phosphates: Bottom Sample

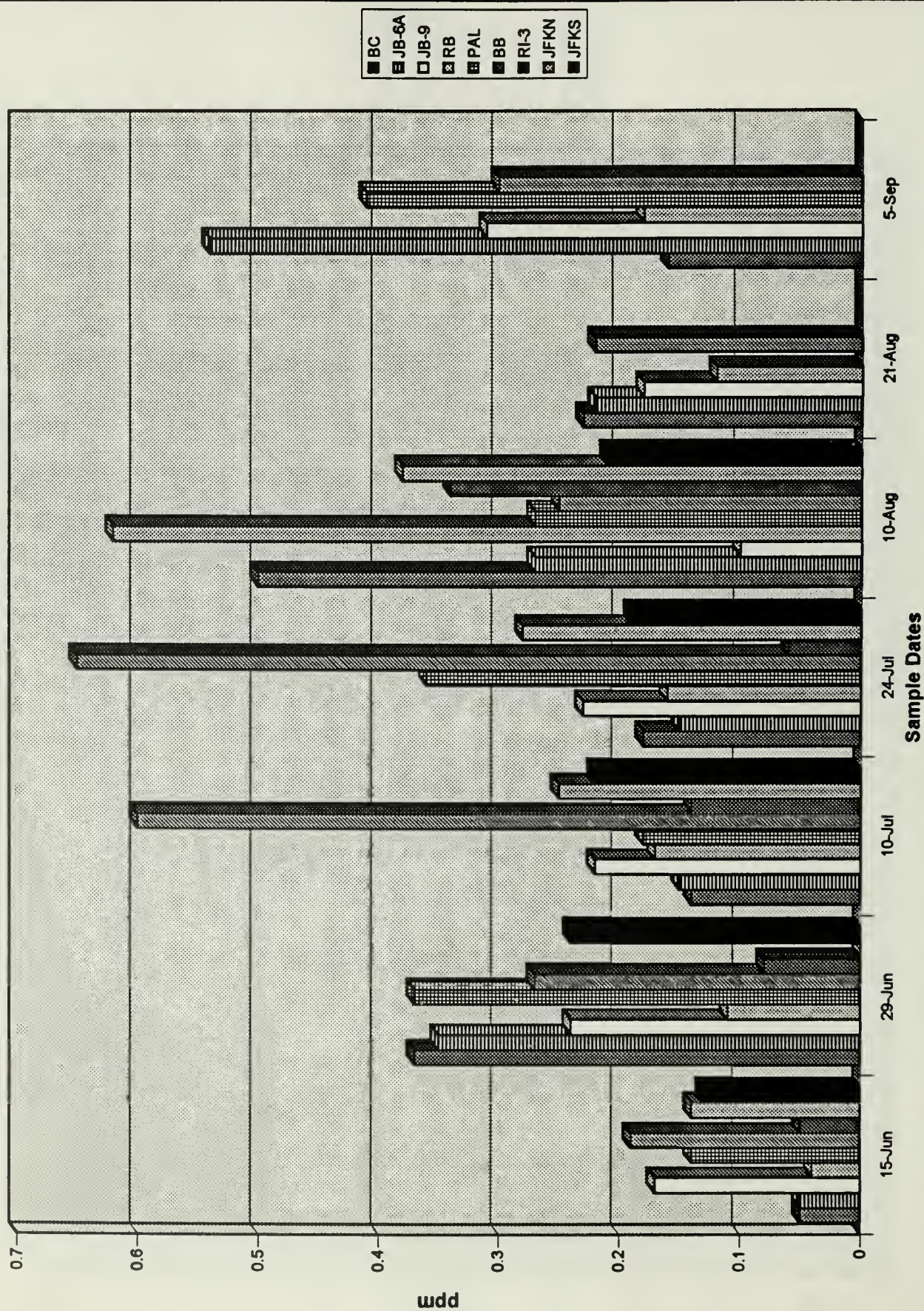


Figure 72

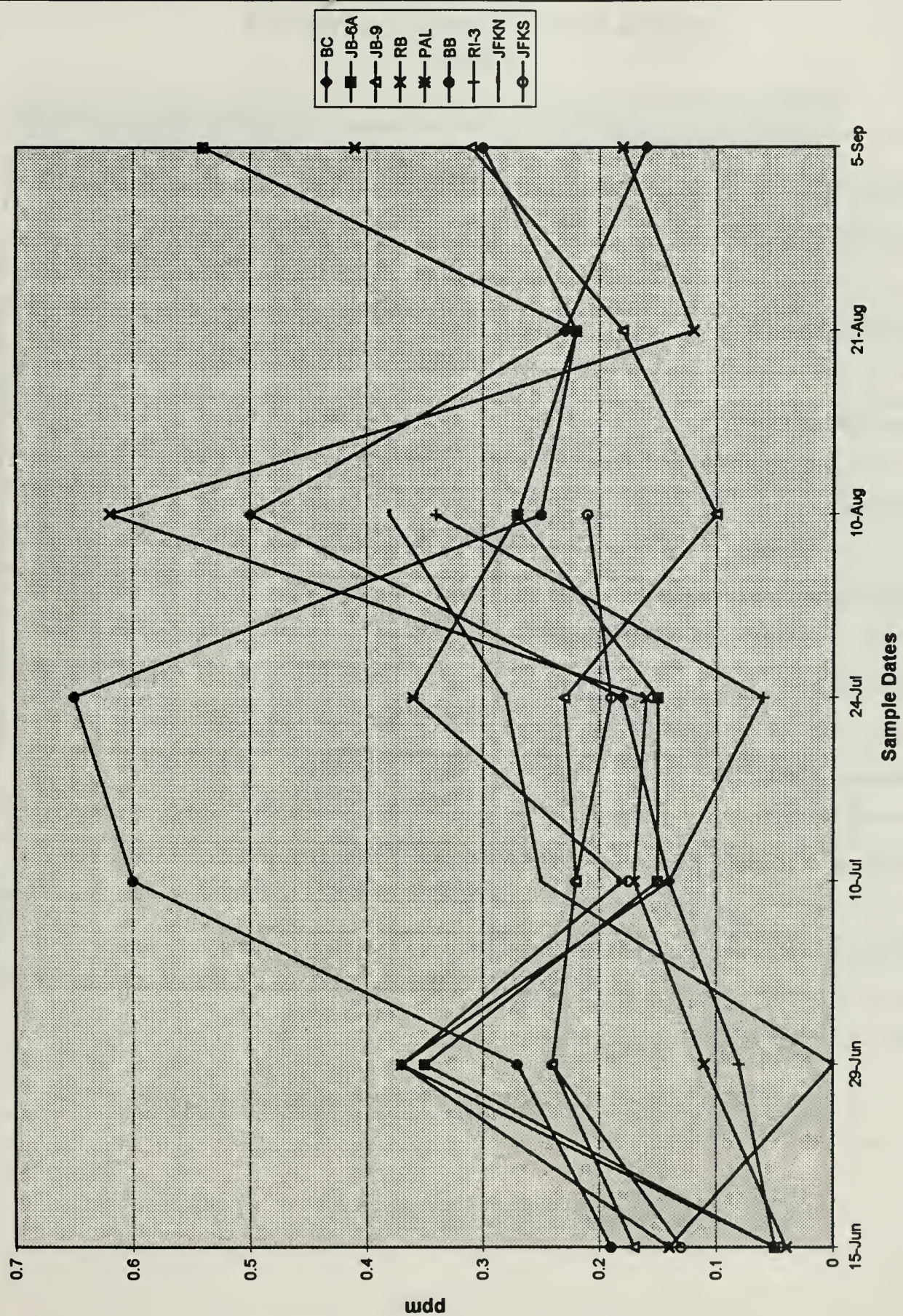


Figure 73

Table XXVI
Jamaica Bay Chlorophyll a (mg/m³)
1995

Sample Location	Site	Depth	Sample Dates			
			6/19	7/17	8/14	9/05
Beach Channel	BC	Top	15.310	4.416	9.723	6.500
		Bottom	41.142	4.416	7.362	4.400
Hendrix Creek	JB-6A	Top	6.400	4.416	5.300	2.400
		Bottom	44.926	2.062	11.778	0
Bergen Basin Outflow	JB-9	Top	2.370	4.108	7.670	0
		Bottom	4.030	4.416	9.408	0
Ruffle Bar	RB	Top	6.786	4.416	2.836	2.400
		Bottom	13.588	4.416	7.362	4.700
Pennsylvania Avenue Landfill	PAL	Top	22.112	2.062	11.762	4.700
		Bottom	4.432	1.738	11.454	4.700
Bergen Basin	BB	Top	0.192	2.062	7.670	8.900
		Bottom	4.030	2.046	9.732	4.700
Rockaway Inlet	RI-3	Top	8.848	4.108	4.992	4.400
		Bottom	21.384	2.062	N/D	N/D
JFK North of Runway Extension	JFKN	Top	4.432	8.832	14.148	6.800
		Bottom	19.418	6.478	N/D	N/D
JFK South of Runway Extension	JFKS	Top	11.218	8.848	N/D	N/D
		Bottom	6.400	6.154	N/D	N/D

N/D: No Data.

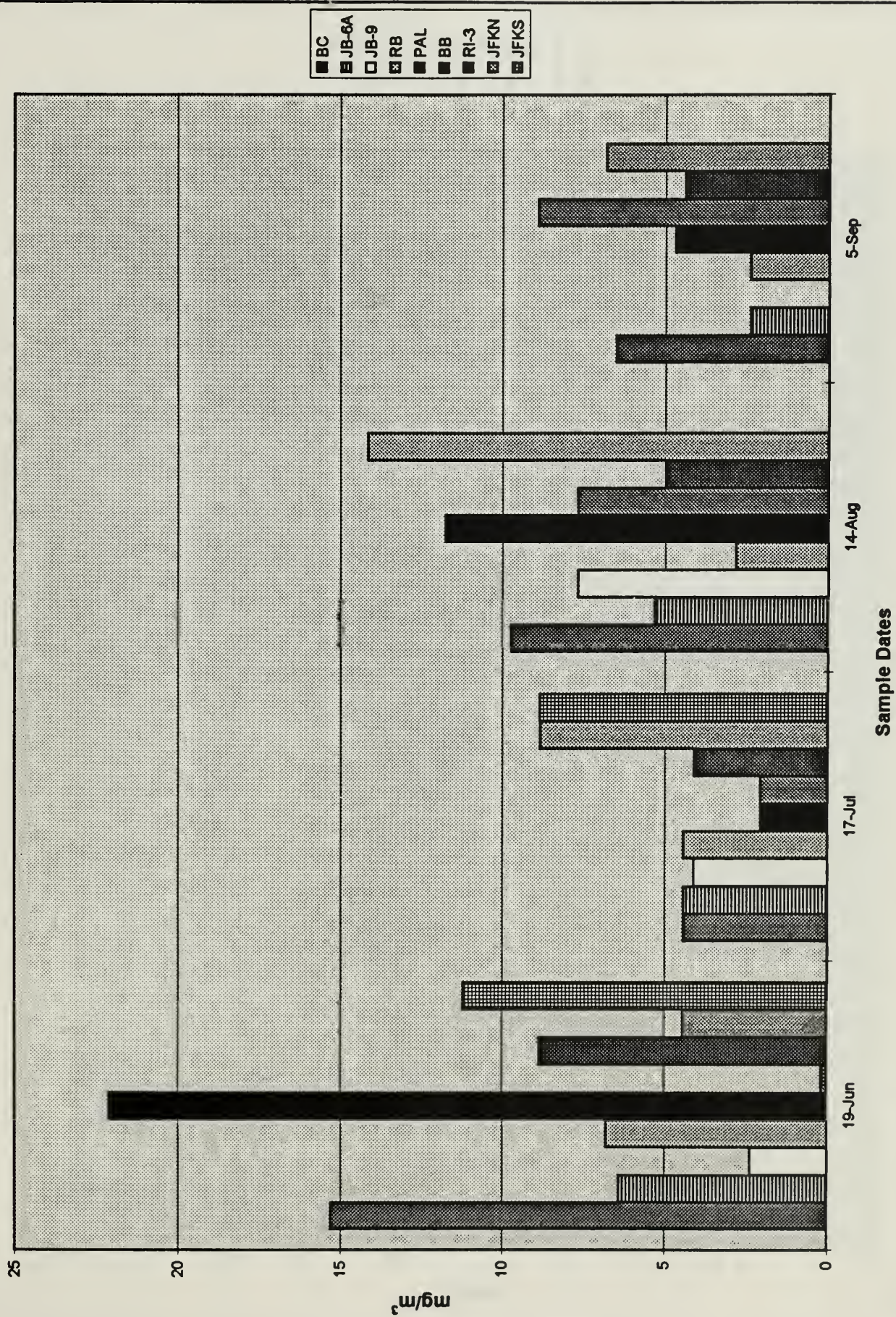


Figure 74

Jamaica Bay Chlorophyll a: Top Samples

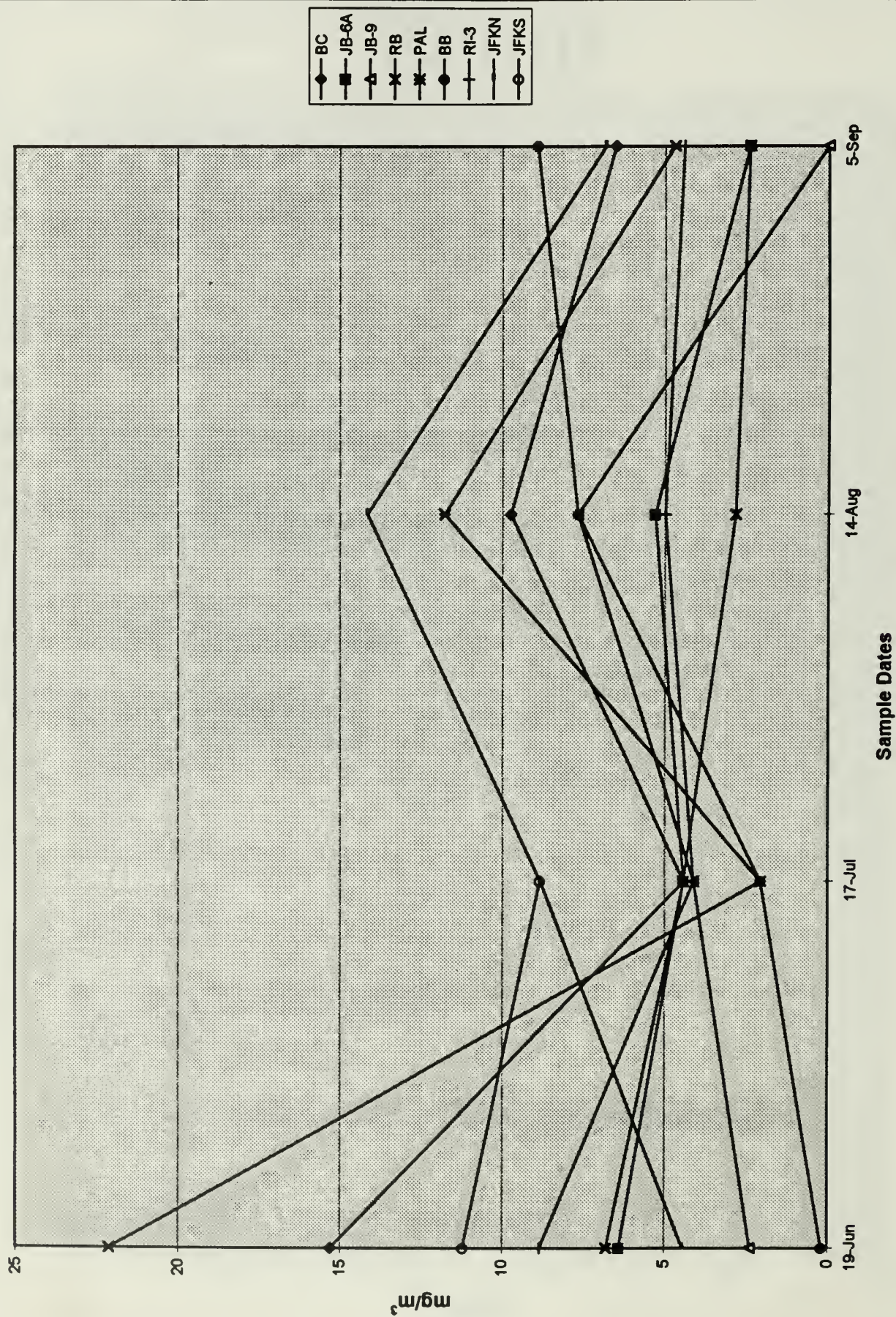


Figure 75

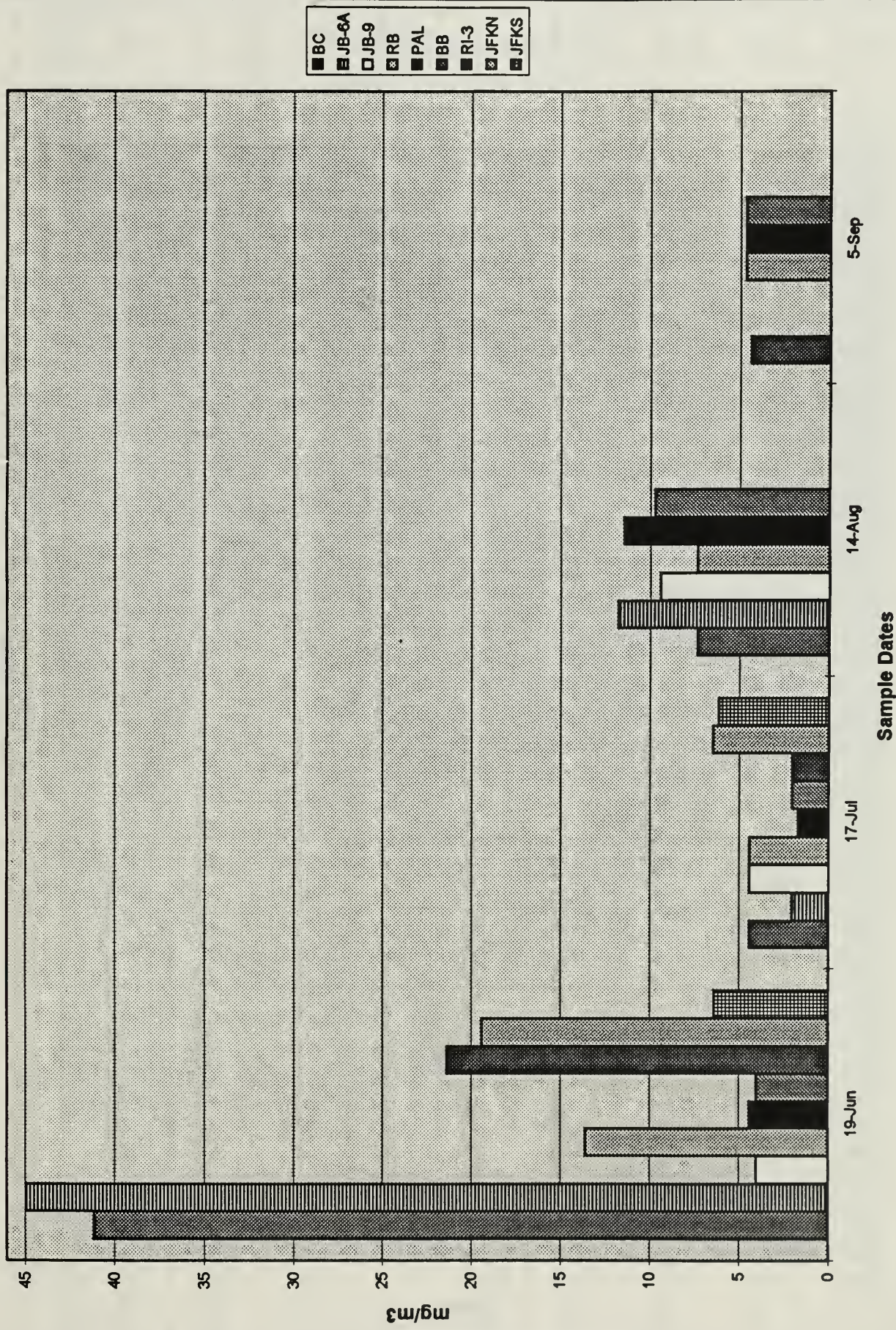


Figure 76

Jamaica Bay Chlorophyll a: Bottom Samples

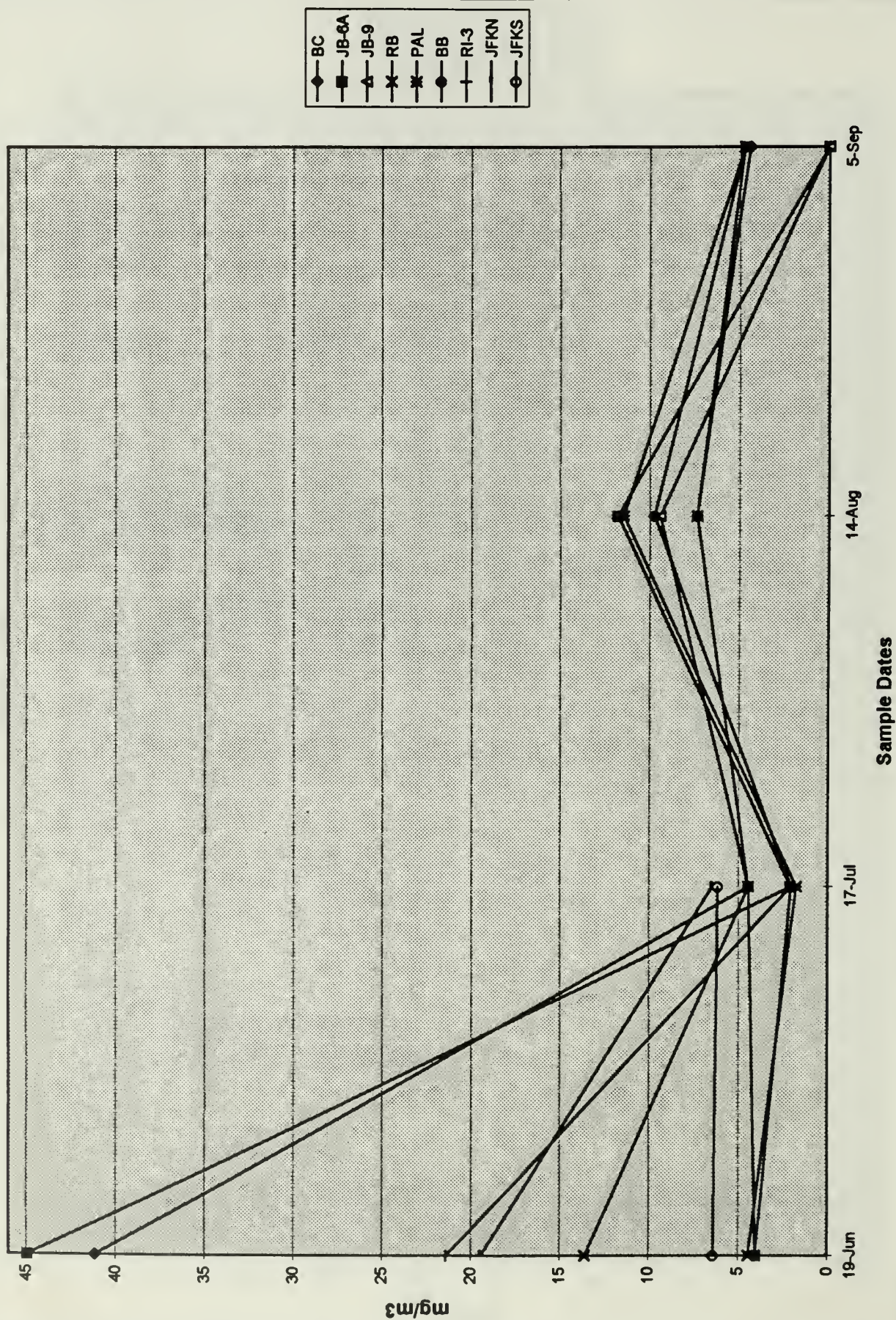


Figure 77

1995

Sample Location	Site	Depth	Sample Dates													
			6/05	6/15	6/19	6/29	7/06	7/10	7/17	7/24	7/31	8/10	8/14	8/21	8/28	9/05
Beach Channel	BC	Top Bottom	29 29	203 145	145 87	116 174	29 58	348 319	174 290	551 377	87 116	145 29	29 29	5742 145	29 0	87 58
Hendrix Creek	JB-6A	Top Bottom	986 1044	232 87	986 58	87 58	2146 174	1595 377	1276 2204	435 377	145 116	29 0	261 899	116 0	0 812	29 0
Bergen Basin Outflow	JB-9	Top Bottom	58 725	0 1363	0 1421	0 1015	1827 725	29 2755	0 2233	0 3422	0 1421	0 10179	116 232	116 0	609 319	58 29
Ruffle Bar	RB	Top Bottom	29 87	0 116	783 116	174 261	319 145	145 174	290 116	145 261	58 0	0 0	0 29	5162 5742	0 58	58 174
Pennsylvania Avenue Landfill	PAL	Top Bottom	1421 406	1160 1160	1624 29	319 290	2004 1015	2900 725	3248 2088	1276 435	638 928	232 290	1015 957	174 29	1015 609	232 261
Bergen Basin	BB	Top Bottom	0 87	87 1421	0 957	0 783	58 1421	0 3248	0 1798	0 0	0 1305	0 2610	464 319	377 1102	1189 725	2349 841
Rockaway Inlet	RI-3	Top Bottom	0 29	116 0	0 0	174 348	0 0	2610 464	29 29	174 1682	0 29	0 0	87 N/D	145 N/D	203 N/D	319 N/D
JFK North of Runway Extension	JFKN	Top Bottom	116 145	870 406	58 551	145 203	29 58	2059 1189	957 1131	1073 493	522 435	928 58	0 N/D	0 N/D	348 N/D	0 N/D
JFK South of Runway Extension	JFKS	Top Bottom	0 0	783 522	58 0	232 609	0 0	638 29	261 522	232 174	29 0	58 58	N/D N/D	N/D N/D	N/D N/D	N/D N/D

N/D: No Data

Jamaica Bay Total Coliform Counts: Top Samples

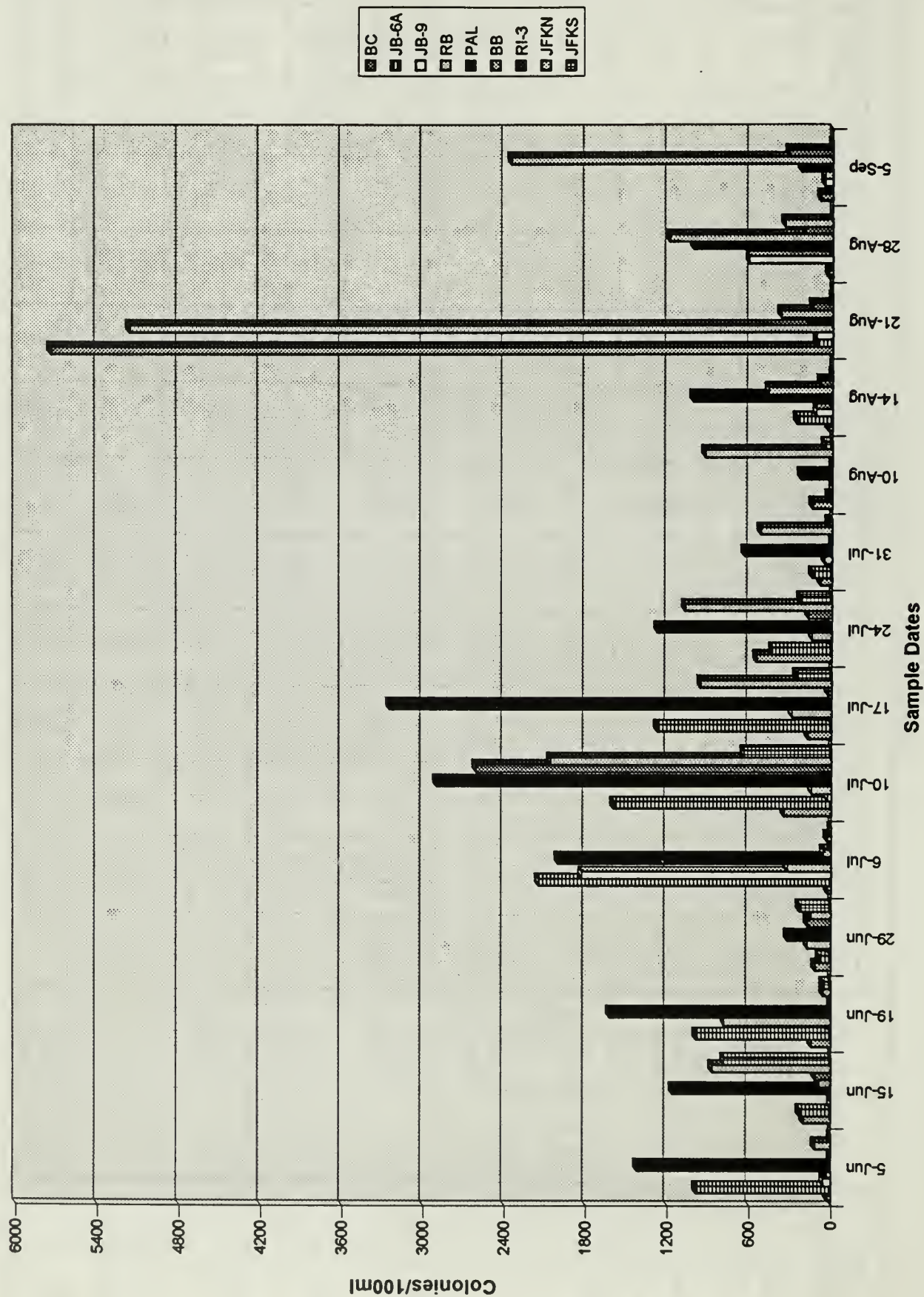


Figure 78

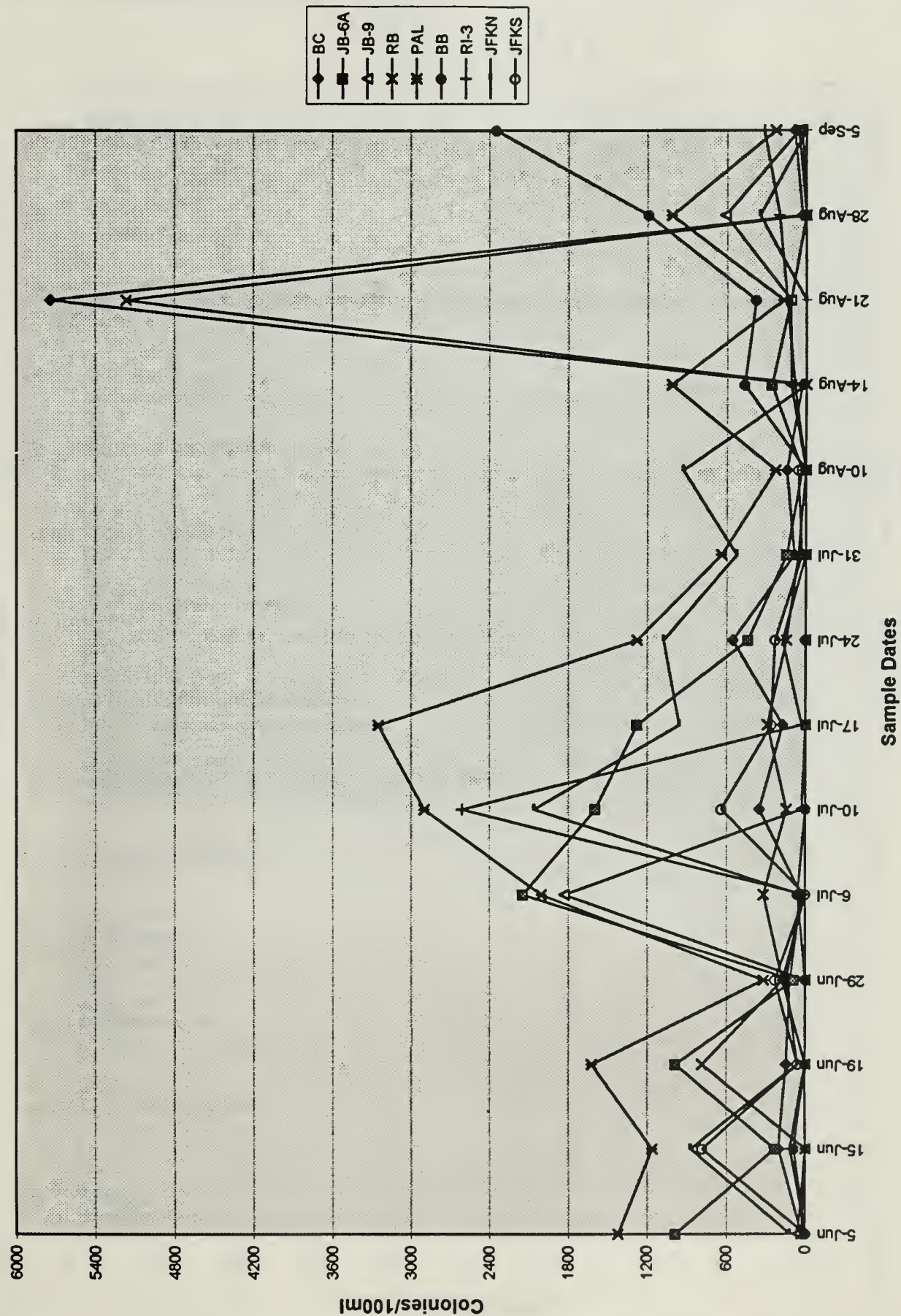


Figure 79

Jamaica Bay Total Coliform Counts: Bottom Samples

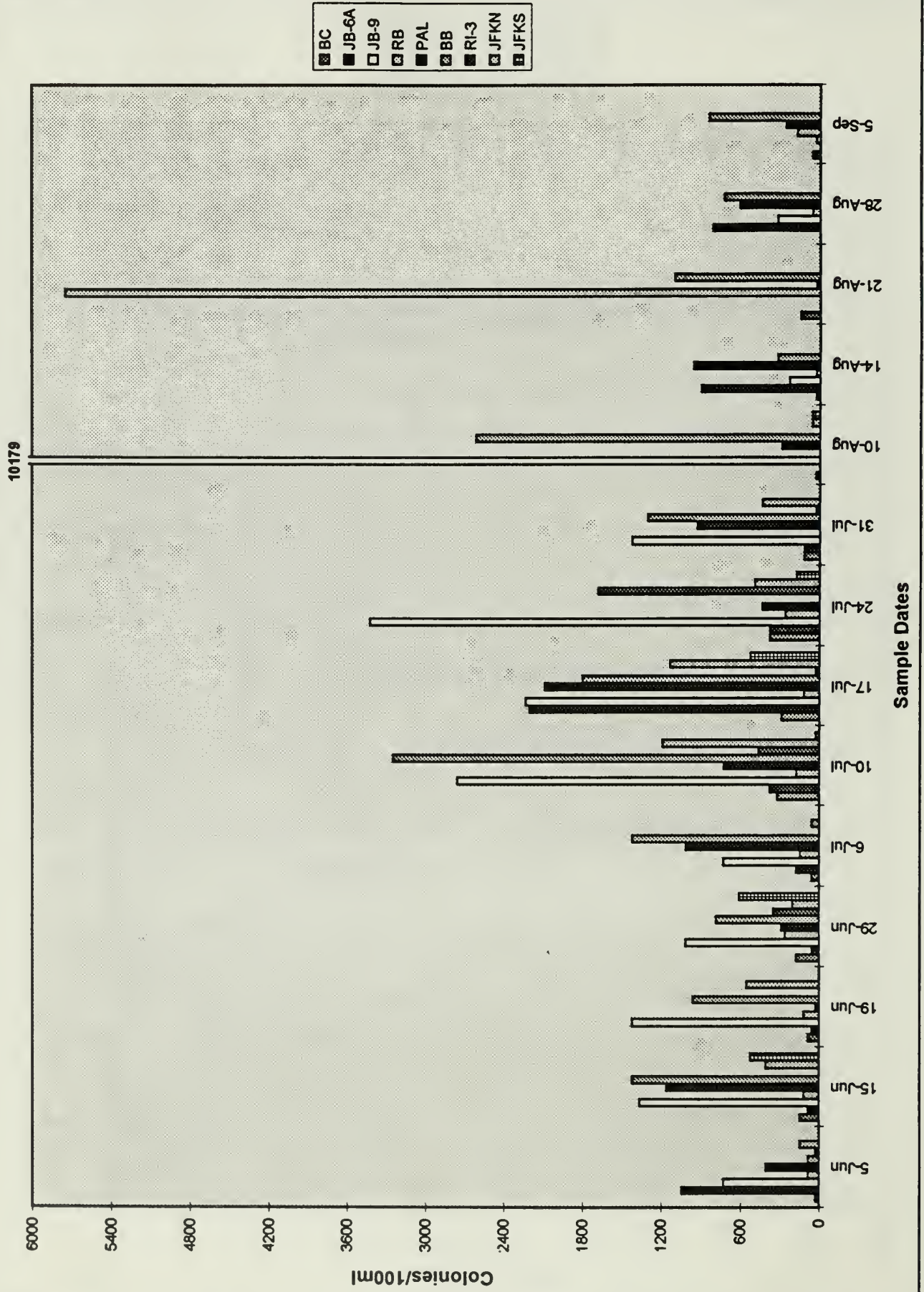


Figure 80

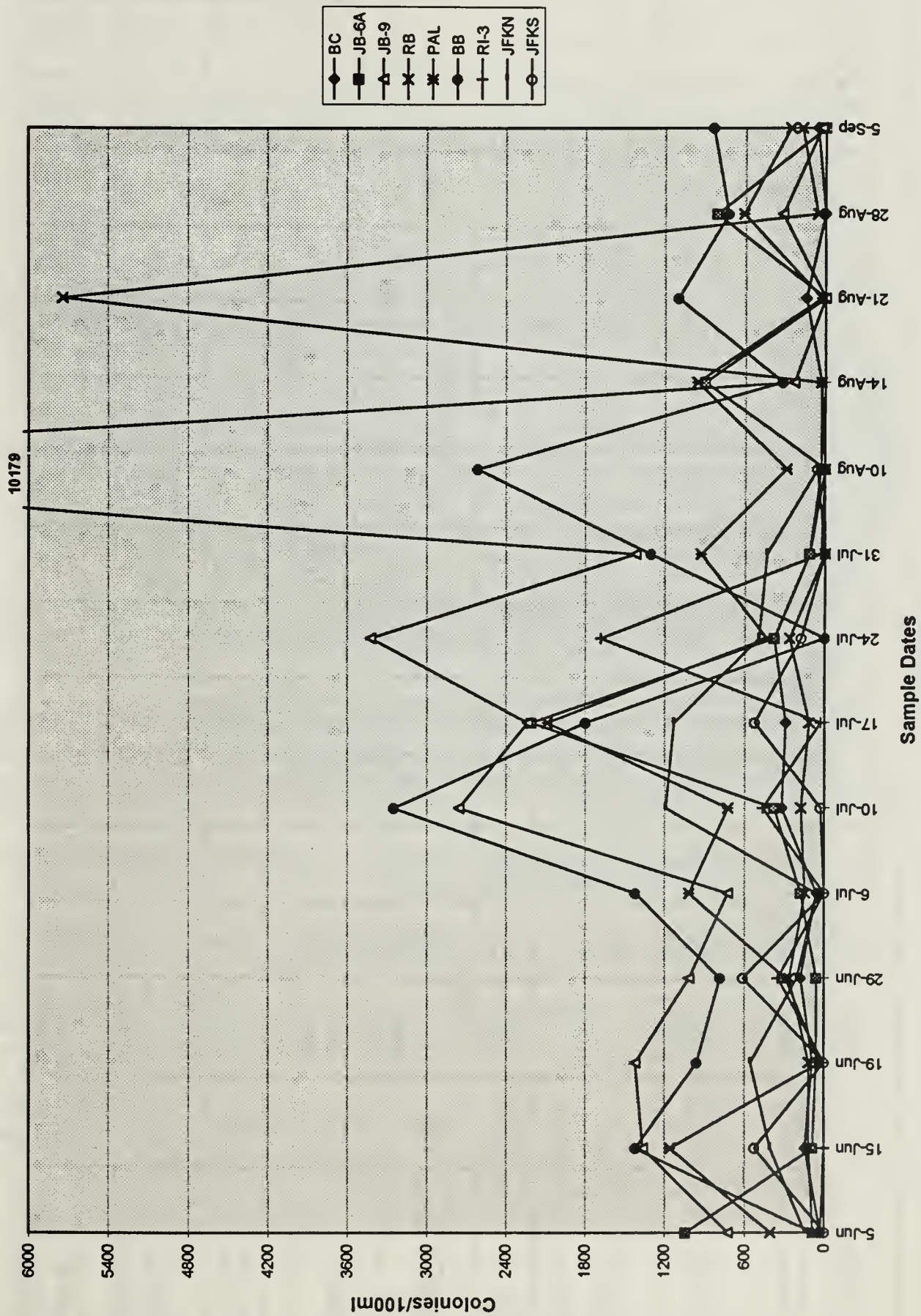
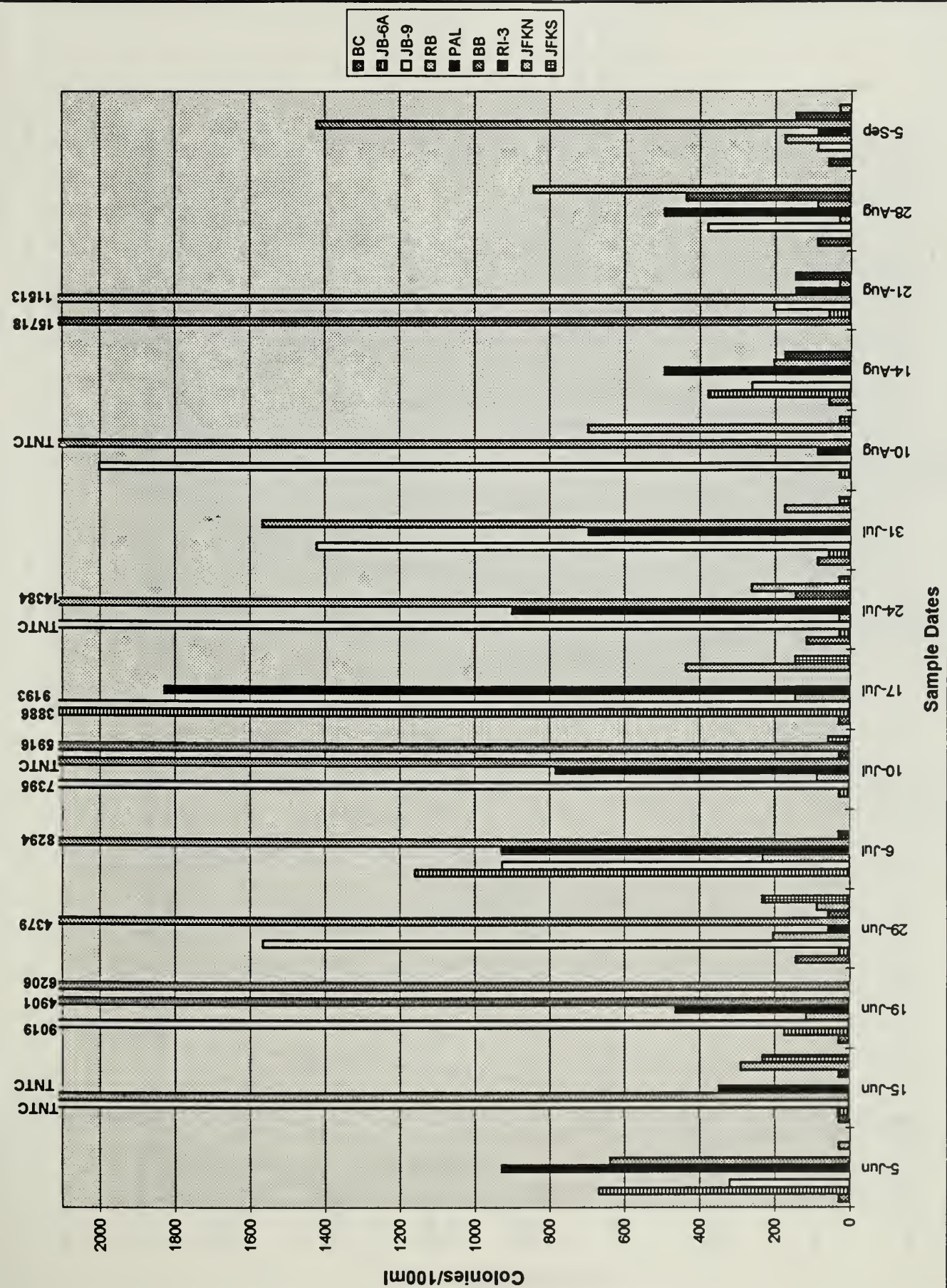


Figure 81

Table XXVIII
Jamaica Bay Fecal Coliform Counts (colonies/100ml)
1995

Sample Location	Site	Depth	Sample Dates														8/28	8/21	8/14	8/10	7/31	7/24	7/17	7/10	7/06	6/29	6/19	6/15	6/05	9/05
Beach Channel	BC	Top	29	29	29	143	0	0	29	116	87	0	87	29	0	58	15718	87	0	0	58	0	29	0	0	58	0			
		Bottom	29	0	0	87	29	145	87	58																				
Hendrix Creek	JB-6A	Top	667	29	174	29	1160	29	3886	29	58	29	377	58	0	0	0	0	0	0	0	0	0	0	0	0	0			
		Bottom	348	58	29	87	116	174	1450	0																				
Bergen Basin Outflow	JB-9	Top	319	TNTC	9019	1566	927	7395	9193	TNTC	1421	2001	261	203	0	0	0	0	0	0	0	0	0	0	0	87	29			
		Bottom	174	551	609	1189	203	957	2465	1682	1479	1827	116	0	87	0	58	15718	29	0	58	0	0	0	0	116				
Ruffle Bar	RB	Top	0	TNTC	116	203	232	87	145	29	0	0	0	11513	29	0	0	0	0	0	0	0	0	0	0	174	0			
		Bottom	29	29	29	29	87	58	29	29	0	0	0	58	15718	29	0	58	15718	29	0	58	0	0	0	116	0			
Pennsylvania Avenue Landfill	PAL	Top	928	348	464	58	928	783	1827	899	696	87	493	145	493	87	145	493	0	87	493	261	377	0	0	87	261			
		Bottom	377	464	29	87	580	261	1278	58	290	87	87	377	0	493	0	493	0	87	493	261	377	0	0	261	0			
Bergen Basin	BB	Top	638	0	4901	4379	8294	TNTC	0	14384	1566	TNTC	203	29	87	203	29	87	29	TNTC	203	174	754	0	0	1421	0			
		Bottom	1769	493	1856	899	261	1189	1508	7685	1682	754	174	203	0	261	0	261	0	754	174	0	0	0	0	377	0			
Rockaway Inlet	RI-3	Top	0	29	0	58	29	29	0	145	0	0	174	145	435	87	145	435	0	0	435	261	N/D	0	0	145	0			
		Bottom	0	0	0	203	29	145	0	116	29	0	0	N/D	N/D	N/D	0	N/D	N/D	0	N/D	N/D	0	0	0	N/D	0			
JFK North of Runway Extension	JFKN	Top	29	290	6206	87	0	5916	435	261	174	696	0	0	841	0	0	841	0	696	0	0	0	0	0	29	0			
		Bottom	29	87	377	116	0	290	754	116	87	87	0	N/D	N/D	N/D	0	N/D	N/D	0	0	N/D	0	0	0	N/D	0			
JFK South of Runway Extension	JFKS	Top	0	232	0	232	0	58	145	29	29	29	N/D	N/D	N/D	0	N/D	N/D	0	29	N/D	0	0	0	0	N/D	0			
		Bottom	29	203	29	87	0	58	87	0	0	58	58	N/D	N/D	N/D	0	N/D	N/D	29	58	N/D	0	0	0	N/D	0			

Figure 82



Jamaica Bay Fecal Coliform Counts: Top Samples

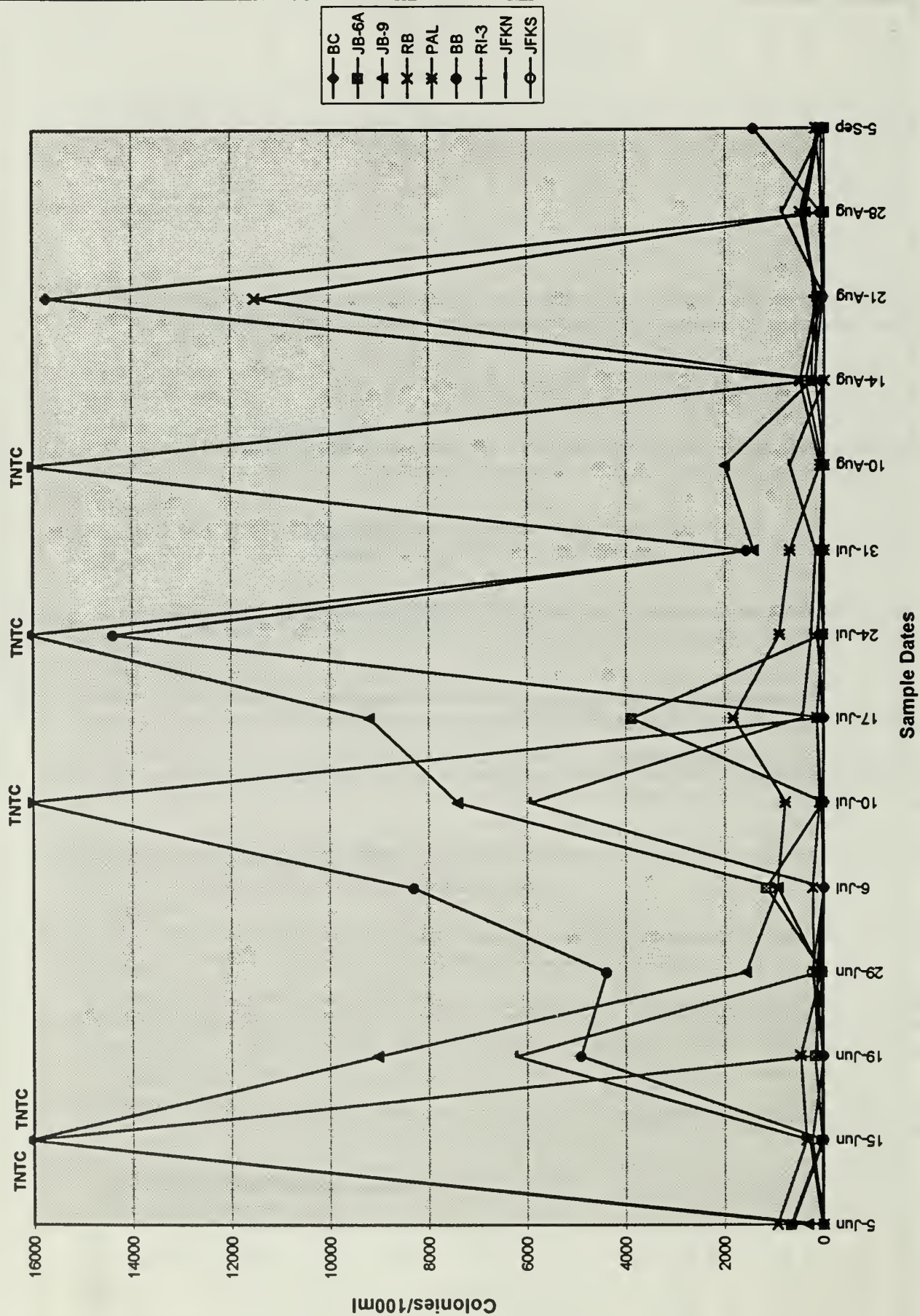


Figure 83

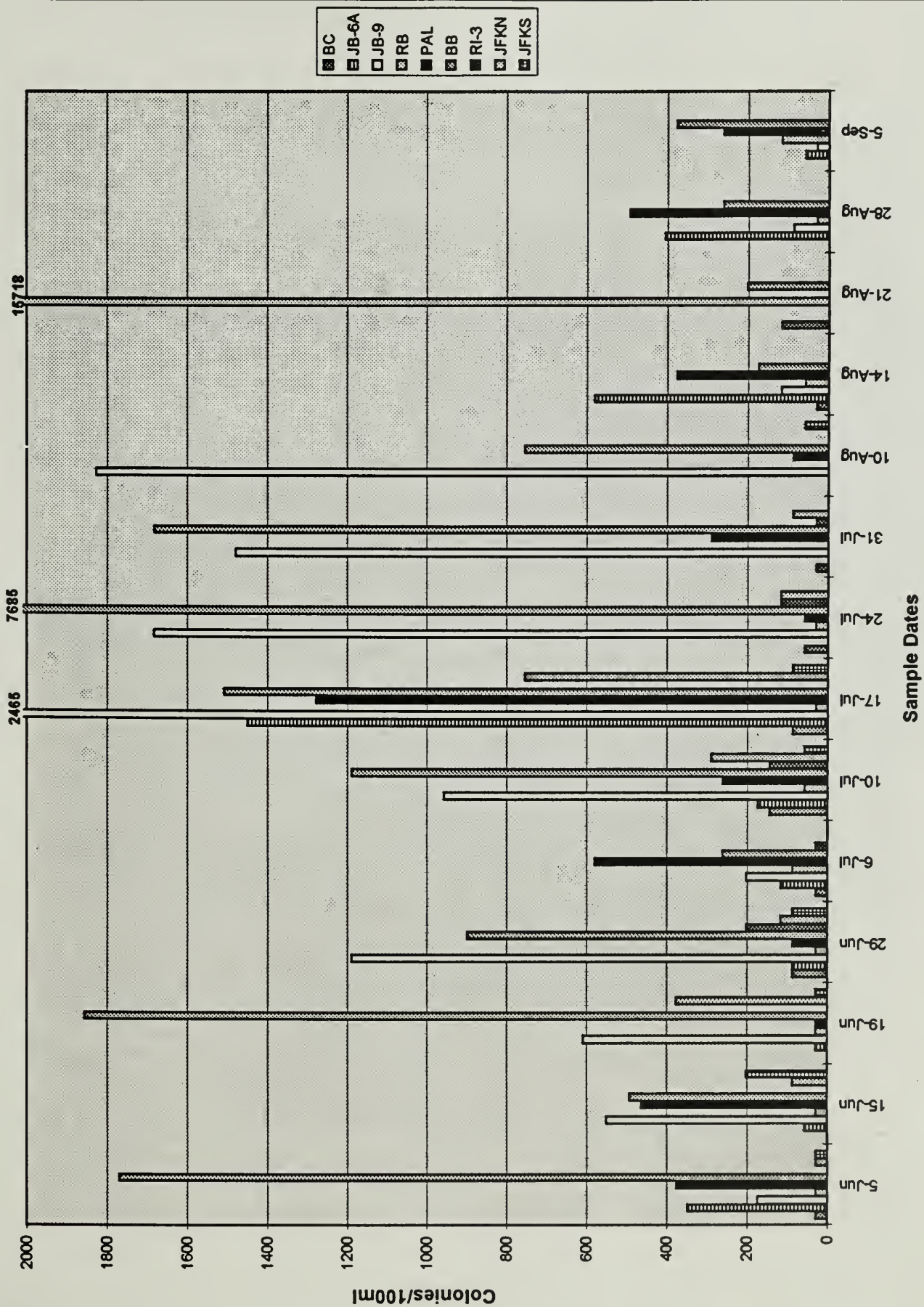


Figure 84

Jamaica Bay Fecal Coliform Counts: Bottom Samples

