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# 77-4 Hydrographic and Biological Observations at an Anchor Station Off St. Augustine, Florida (Eastward Cruise E-1G-75)

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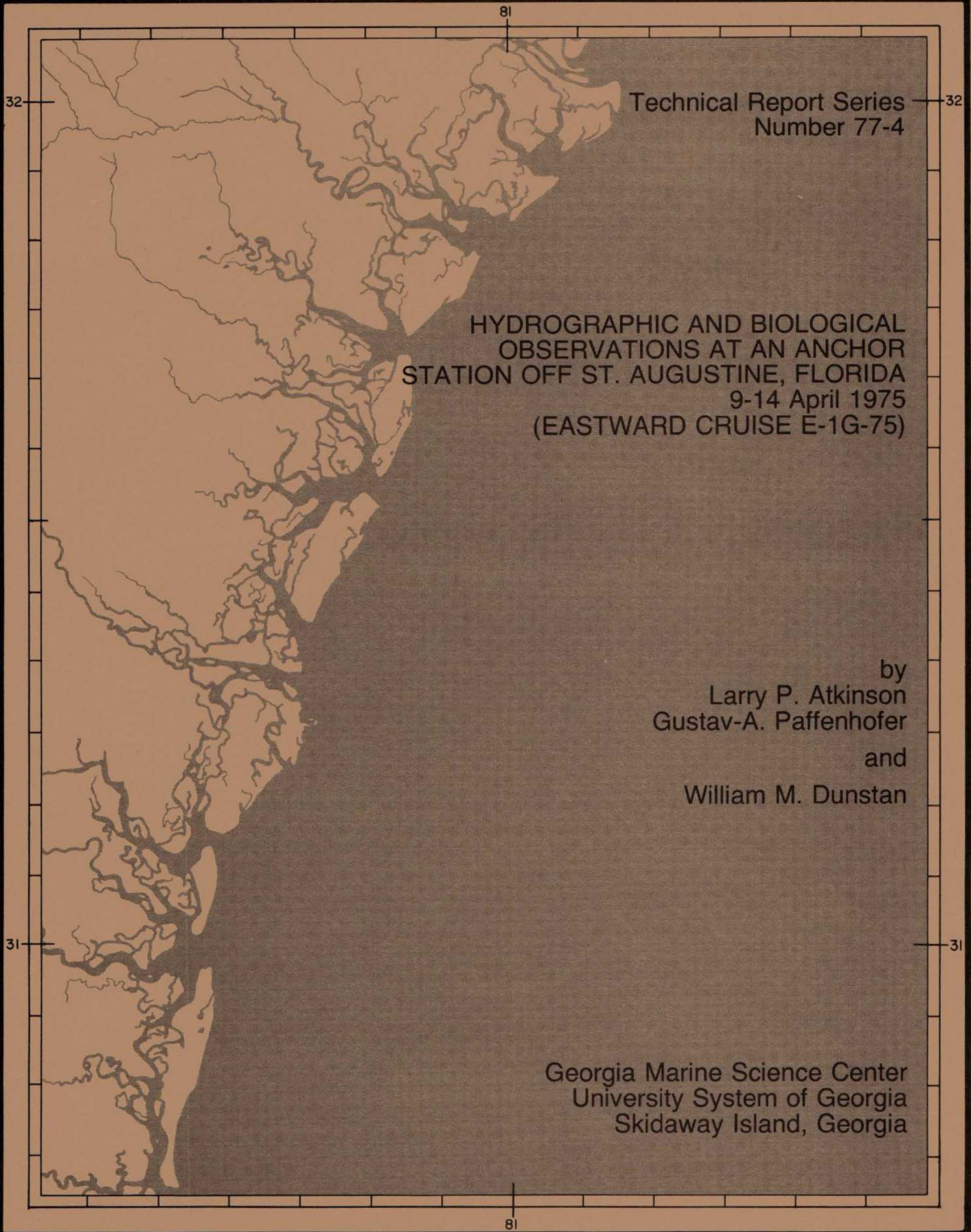
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HYDROGRAPHIC AND BIOLOGICAL  
OBSERVATIONS AT AN ANCHOR  
STATION OFF ST. AUGUSTINE, FLORIDA  
9-14 April 1975  
(EASTWARD CRUISE E-1G-75)

by  
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Gustav-A. Paffenhofer  
and  
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Georgia Marine Science Center  
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## INTRODUCTION

The intrusion of deep, nutrient-rich Gulf Stream water into the shelf waters off the southeastern United States is probably the major source of nutrients in the shelf waters and consequently intrusions have a major impact on the biota. This particular cruise was one of the first to be designed to find the front that represents the interface between intruding Gulf Stream waters and normal shelf water. Once the front was delineated an anchor station was occupied to observe the time change at a particular location as the front moved back and forth past the station.

The methods used and resultant data from that cruise are presented to aid others in the analyses of intrusions and related phenomena.

## AREA AND STATIONS

The area chosen for the study is shown in Figure 1. This location was chosen for the study because it was felt that an intrusion could be observed at this time of year and the weather would be moderate.

Initial observations were made at locations 1-10. Observations 11-37 were then made at the anchor station, followed by hydrographic observations which were made at stations 38-43.

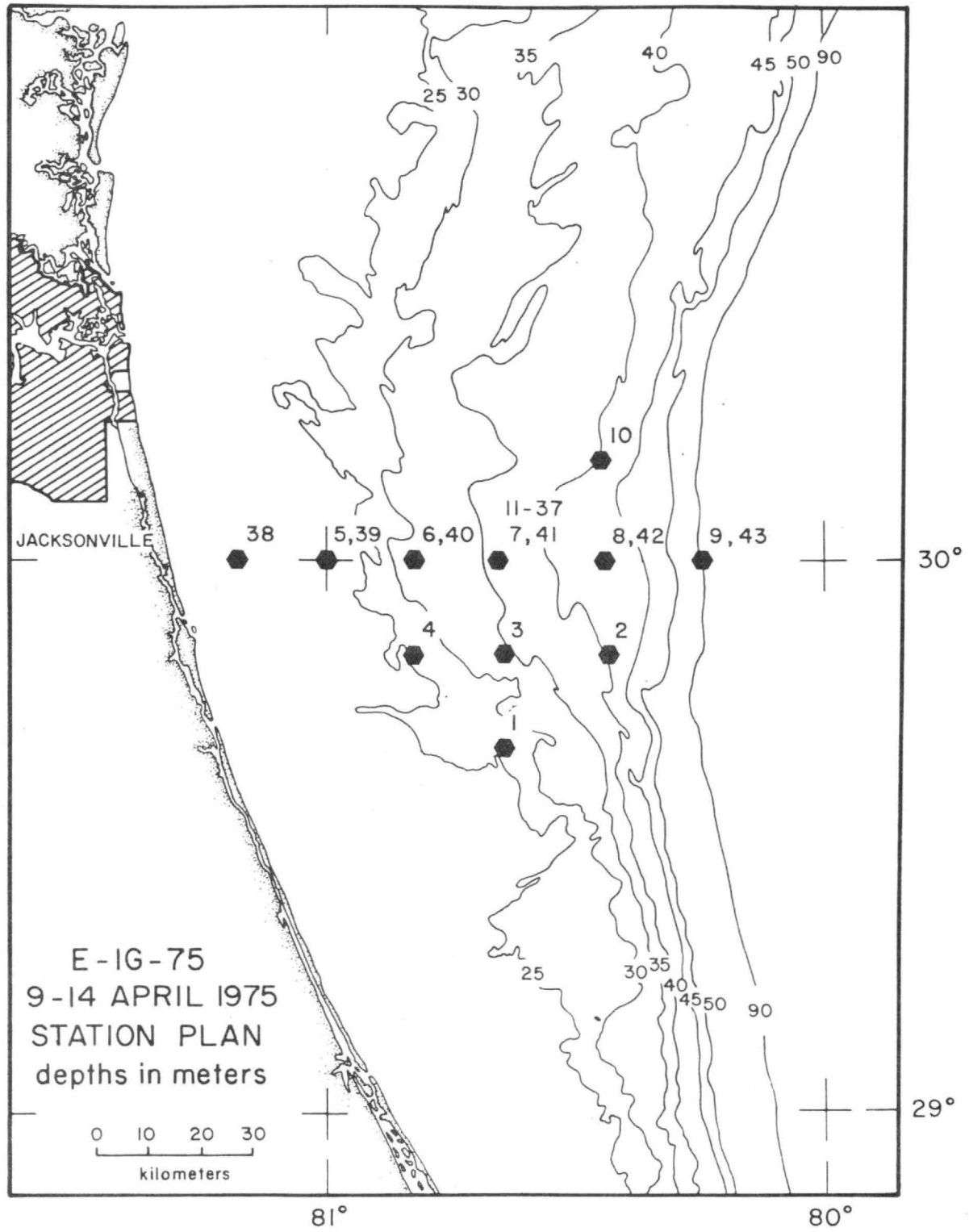


FIGURE 1. THE STUDY AREA.



## METHODS

Meteorological

Weather and sea-state observations were made hourly by the bridge officer. These data were used in determining the weather situation during a station. The data appear in the hydrographic observations printout. An explanation of this code is found in National Oceanographic Data Center Manual Series titled, "Processing Physical and Chemical Data from Oceanographic Station, Part 1, Coding and Key punching". A brief explanation is given at the beginning of Appendix B.

Conductivity/Salinity/Temperature/Depth

An Interocean C/S/T/D with onboard analog and digital recorders was used for the C/S/T/D profiles. Since the probe was not equipped with a Rosette sampler the C/S/T/D cast was followed by a Niskin bottle cast with bottle placing determined by the structure observed during the C/S/T/D cast.

The calibration for salinity and temperature was accomplished by tripping a Niskin bottle with reversing thermometers at a near-bottom depth. The bottom layer during the anchor station was well mixed and changed little with time.

A total of 21 temperature calibrations were made with the C/S/T/D averaging 0.108°C higher with a standard deviation of 0.034. Fifteen salinity comparisons were made with C/S/T/D averaging higher by 0.572‰ with a standard deviation of 0.011. These corrections were applied to the C/S/T/D observations.

Nutrients

Water samples were taken in 125 ml polyethylene bottles and quick frozen in a cryogenic freezer, then stored in a deep freezer until analysis.

Phosphate and silicate were determined by the method of Strickland and Parsons (1972). Modifications were made to reduce the volumes required.

Nitrate was determined by the cadmium reduction technique as modified by Gardner (1975).

#### Surface Current

A Bendix Q-15 ducted impeller current meter was suspended at 5 m depth from the port bow of the ship. The current direction and speed were continuously recorded on a two-channel Rustrak recorder. The record was good except for occasional times when ship yaw was quite noticeable. The meter record was hand digitized with averages taken when required.

#### Zooplankton

All zooplankton samples were collected with a cylinder-cone net of 50 cm mouth diameter and 253  $\mu\text{m}$  mesh. The open mesh to mouth area ratio was 8:1. The front part of the net was held in a wide frame to prevent the use of bridles hanging in front of the net mouth. TSK-Flowmeters were placed both inside and outside the net mouth to determine the amount of water filtered and to indicate clogging. The inside flowmeter readings were above 85% of the outside readings thus showing no sign of clogging.

All zooplankton tows were taken while at anchor station from April 10 to 13, 1974, at  $30^{\circ} 0.0\text{N}$  latitude and  $80^{\circ} 38.0\text{W}$  longitude. Every tow was oblique (Surface - 10 to 12 m in depth - surface). The speed of the current along the boat ranged from 0.4 to 1.2 knots. The volume of seawater filtered ranged from 3.49 to 20.19  $\text{m}^3$ .

All samples were immediately preserved in 2% buffered Formaldehyde. Within four weeks all samples were transformed into Glycol-Phenoxetol for preservation. If necessary, samples were split with a Folsom plankton splitter. The amounts counted ranged from 1/8 to an entire sample. The preserved animals showed little sign of damage. This is mainly attributed to the slow towing speed and the fixation/preservation technique.

#### Chlorophyll a and Phytoplankton

Chlorophyll a concentrations were determined fluorometrically using an extraction method adapted from Yentsch and Menzel (1963). Samples for phytoplankton cell analysis were preserved in Lugol's solution modified by Utermöhl (1958).

#### DATA STORAGE

All data presented here and some additional items are on file at the Skidaway Institute of Oceanography. The hydrographic data are on file at the National Oceanographic Data Center.

## CRUISE PARTICIPANTS

The following people participated in this cruise:

Larry P. Atkinson, Skidaway Institute

Roger B. Hanson, Marine Institute (Sapelo)

John Wheeler, Marine Institute (Sapelo)

Louise Jaffe, Skidaway Institute

Diane Wynne, Skidaway Institute

Gustav-A. Paffenhofer, Skidaway Institute

## ACKNOWLEDGEMENTS

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The usual outstanding cooperation of the EASTWARD crew is appreciated.

We would like to thank the following people who took part in the data reduction and report preparation: Dan Perlmutter, drafting; Paula Vopelak, typing; Louise Jaffe, Robert Bernatsky, Lisa Morehouse, data reduction.

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APPENDIX A  
STATION LIST

The station list gives the location, time (UT) + 5 to EST, + 4 to (EDT) and depth.



## STATION SUMMARY FOR EASTWARD CRUISE E-16-75

STATION	LATITUDE	LONGITUDE	YR	MN	DY	HOUR	DEPTH M	CONSEC NUMBER
1	29 40.0N	80 38.0W	75	4	9	12.0	28	1
2	29 50.0N	80 25.8W	75	4	9	14.2	39	2
3	29 50.0N	80 38.0W	75	4	9	16.0	33	3
4	29 49.7N	80 49.5W	75	4	9	18.4	27	4
5	30 0.0N	81 1.0W	75	4	9	20.5	22	5
6	30 .5N	80 49.0W	75	4	9	22.7	33	6
7	30 0.0N	80 38.0W	75	4	10	.8	38	7
8	30 0.0N	80 26.5W	75	4	10	2.5	42	8
9	30 0.0N	80 15.0W	75	4	10	4.2	136	9
10	30 9.8N	80 26.9W	75	4	10	6.9	38	10
11	30 0.0N	80 38.5W	75	4	10	8.3	38	11
12	30 0.0N	80 38.0W	75	4	10	13.7	38	12
13	30 0.0N	80 38.0W	75	4	10	16.2	38	13
14	30 0.0N	80 38.0W	75	4	10	19.2	38	14
15	30 0.0N	80 38.0W	75	4	10	22.1	38	15
16	30 0.0N	80 38.0W	75	4	11	1.0	38	16
17	30 0.0N	80 38.0W	75	4	11	4.1	38	17
18	30 0.0N	80 38.0W	75	4	11	7.0	38	18
19	30 0.0N	80 38.0W	75	4	11	10.1	38	19
20	30 0.0N	80 38.0W	75	4	11	13.1	38	20
21	30 0.0N	80 38.0W	75	4	11	16.0	38	21
22	30 0.0N	80 38.0W	75	4	11	19.0	38	22
23	30 0.0N	80 38.0W	75	4	11	22.1	38	23
24	30 0.0N	80 38.0W	75	4	12	1.5	38	24
25	30 0.0N	80 38.0W	75	4	12	4.0	38	25
26	30 0.0N	80 38.0W	75	4	12	7.0	38	26
27	30 0.0N	80 38.0W	75	4	12	10.2	38	27
28	30 0.0N	80 38.0W	75	4	12	13.1	38	28
29	30 0.0N	80 38.0W	75	4	12	16.0	38	29
30	30 0.0N	80 38.0W	75	4	12	19.0	38	30
31	30 0.0N	80 38.0W	75	4	12	22.2	38	31
32	30 0.0N	80 38.0W	75	4	13	1.1	38	32
33	30 0.0N	80 38.0W	75	4	13	4.0	38	33
34	30 0.0N	80 38.0W	75	4	13	6.9	38	34
35	30 0.0N	80 38.0W	75	4	13	10.2	38	35
36	30 0.0N	80 38.0W	75	4	13	13.0	38	36
37	30 0.0N	80 38.0W	75	4	13	15.6	38	37
38	30 0.0N	81 12.5W	75	4	13	20.7	13	38
39	30 0.0N	81 1.2W	75	4	13	22.2	21	39
40	30 0.0N	80 49.5W	75	4	14	0.0	27	40
41	30 0.0N	80 38.0W	75	4	14	1.7	35	41
42	30 0.0N	80 26.2W	75	4	14	3.5	42	42
43	30 0.0N	80 15.2W	75	4	14	5.4	101	43

APPENDIX B  
HYDROGRAPHIC DATA

The following printout is taken from the NODC listing and processed with a Skidaway Institute code. An explanation of the listing follows:

Header Data: Times are GMT

Weather Data: These data are taken from the ship's log.

Wind Force: In Beaufort Wind Scale. The conversion to m/sec is as follows:

<u>Force</u>	<u>m/sec</u>
0	0-0.2
1	0.3-1.5
2	1.5-3.3
3	3.4-5.4
4	5.5-7.9
5	8.0-10.7
6	10.8-13.8
7	13.9-17.1

Wind direction: direction in degrees

Air temp: in degrees Celcius

Weather code: WMO Code 4501

Atmospheric Pressure: in millibars

Sea state: not recorded

Wave direction: in degrees

Cloud type: WMO Code 0500

Cloud amount: WMO Code 2700

Visibility code: not given

The hydrographic notations are as follows:

$z$  = observation in meters

$T$  = temperature in  $^{\circ}\text{C}$

$S$  = salinity in  $\text{‰}$

$D$  = density in sigma-t units

SVA = specific volume anomaly  $\times 10^5$

$O_2$  = not given

$O_2^{\frac{1}{2}}$  = not given

AOU = not given

$O_2A$  = not given

PO4 = phosphate concentrations in  $\mu\text{m}$

$\text{NO}_3$  = nitrate concentrations in  $\mu\text{m}$

Si = silicate

N/P = nitrate phosphate ratio

EASTWARD CRUISE 16 STATION 1 9/ IV/75 12.0 GMT CONSECUTIVE STATION 1

LAT. = 29 40.0N LONG. = 80 38.0W DEPTH = 28M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 2	SEA STATE	=
WIND DIRECTION	=266-274 DEGR	WAVE DIRECTION	=176-184 DEGR
AIR TEMP	= 21.7C	CLOUD TYPE	= 7
WEATHER CODE	= 1	CLOUD AMOUNT	=
BAROMETRIC PRESSURE	= 1016.6 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SVA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.51	36.05	25.44	254					.33	1.1	3.6	3.3
10	20.27								.14	1.2	2.7	8.6
25	20.16	36.05	25.54	246					.25	2.0	2.2	8.0

EASTWARD CRUISE 16 STATION 2 9/ IV/75 14.2 GMT CONSECUTIVE STATION 2

LAT. = 29 50.0N LONG. = 80 25.8W DEPTH = 39M DIST LAST STA = 27.0KM

WEATHER DATA

WIND FORCE	= 2	SEA STATE	=
WIND DIRECTION	=266-274 DEGR	WAVE DIRECTION	=266-274 DEGR
AIR TEMP	= 23.3C	CLOUD TYPE	= 8
WEATHER CODE	= 1	CLOUD AMOUNT	=
BAROMETRIC PRESSURE	= 1019.0 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SVA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.78	36.20	25.21	276					.03	1.1	1.7	36.7
10	21.73								.07	.8	1.1	11.4
20	21.73								.07	.8	0.0	11.4
35	20.04	36.04	25.56	244					.19	1.2	1.6	6.3

EASTWARD CRUISE 16 STATION 3 9/ IV/75 16.0 GMT CONSECUTIVE STATION 3

LAT. = 29 50.0N LONG. = 80 38.0W DEPTH = 33M DIST LAST STA = 19.6KM

WEATHER DATA

WIND FORCE	= 2	SEA STATE	=
WIND DIRECTION	=266-274 DEGR	WAVE DIRECTION	=266-274 DEGR
AIR TEMP	= 23.90	CLOUD TYPE	= 8
WEATHER CODE	= 1	CLOUD AMOUNT	=3
BAROMETRIC PRESSURE	= 1019.0 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	ADU	O2A	PO4	NO3	SI	N/P
0	20.54	35.92	25.34	264					.08		2.5	
5	20.63									.6		
12	20.38								.11	1.2	3.0	10.9
22	20.05								.16	1.2	3.3	7.5
32	20.06								.16	1.2	3.3	7.5

EASTWARD CRUISE 16 STATION 4 9/ IV/75 18.4 GMT CONSECUTIVE STATION 4

LAT. = 29 49.7N LONG. = 80 49.5W DEPTH = 27M DIST LAST STA = 18.5KM

WEATHER DATA

WIND FORCE	= 0	SEA STATE	=
WIND DIRECTION	= 4-356 DEGR	WAVE DIRECTION	= 4-356 DEGR
AIR TEMP	= 22.2C	CLOUD TYPE	= 7
WEATHER CODE	= 4	CLOUD AMOUNT	=
BAROMETRIC PRESSURE	= 1017.6 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.63	35.38	24.90	306					.13	1.8	3.5	13.8
10	20.12								.14	.7	3.0	5.0
20	20.11								.16	.5	2.3	3.1
26	20.13	35.52	25.14	284					.15	.7	4.4	4.7

EASTWARD CRUISE 16 STATION 5 9/ IV/75 20.5 GMT CONSECUTIVE STATION 5

LAT. = 30 0.0N LONG. = 81 1.0W DEPTH = 22M DIST LAST STA = 26.6KM

WEATHER DATA

WIND FORCE	= 2	SEA STATE	=
WIND DIRECTION	= 36- 44 DEGR	WAVE DIRECTION	= 36- 44 DEGR
AIR TEMP	= 22.2C	CLOUD TYPE	= 6
WEATHER CODE	= 4	CLOUD AMOUNT	=
BAROMETRIC PRESSURE	= 1016.9 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.13	34.90	24.67	328					.20	1.0	.2	5.0
10	19.57								.14	1.1	.7	7.9
20	19.38	35.96	25.68	232					.20	.6	3.6	3.0

EASTWARD CRUISE 16 STATION 6 9/ IV/75 22.7 GMT CONSECUTIVE STATION 6

LAT. = 30 .5N LONG. = 80 49.0W DEPTH = 33M DIST LAST STA = 19.3KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	=106-114 DEGR	WAVE DIRECTION	= 86- 94 DEGR
AIR TEMP	= 21.7C	CLOUD TYPE	= 7
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1014.6 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	ADU	O2A	PO4	NO3	SI	N/P
0	20.42	35.86	25.32	266					.20	.3	1.6	1.5
10	20.49								.15	.4	2.7	2.7
20	20.15											
30	20.15	35.73	25.30	269					.10	.4	4.6	4.0

EASTWARD CRUISE 16 STATION 7 104 19/75 .8 GMT CONSECUTIVE STATION 7

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 17.7KM

WEATHER DATA

WIND FORCE	= 1	SEA STATE	=
WIND DIRECTION	=106-114 DEGR	WAVE DIRECTION	=106-114 DEGR
AIR TEMP	= 21.7C	CLOUD TYPE	= 7
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1016.9 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	ADU	O2R	PO4	NO3	SI	N/P
0	22.10	36.22	25.14	283					.29	.6	2.1	2.1
15	21.94								1.30		1.6	
25	20.08								.15	1.2	2.0	8.0
30	19.87	36.09	25.64	236					.12	.5	3.0	4.2



EASTWARD CRUISE 16 STATION 8 10/ IV/75 2.5 GMT CONSECUTIVE STATION 8

LAT. = 30 0.0N LONG. = 80 26.5W DEPTH = 42M DIST LAST STA = 18.5KM

WEATHER DATA

WIND FORCE =		SEA STATE =	
WIND DIRECTION =	DEGR	WAVE DIRECTION =	DEGR
AIR TEMP =		CLOUD TYPE =	
WEATHER CODE =		CLOUD AMOUNT =	
BAROMETRIC PRESSURE =	MB	VISIBILITY CODE =	

OBSERVATIONS

Z	T	S	D	SWA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.91	36.21	25.18	279					.07	.8	.9	11.4
15	21.90								.01	.4	1.7	40.0
30	21.00								.11	1.2	1.8	10.9
40	20.17	36.05	25.54	246					.15	2.5	4.1	16.7

EASTWARD CRUISE 16 STATION 9 10/ IV/75 4.2 GMT CONSECUTIVE STATION 9

LAT. = 30 0.0N LONG. = 80 15.0W DEPTH = 136M DIST LAST STA = 18.5KM

WEATHER DATA

WIND FORCE	= 2	SEA STATE	=
WIND DIRECTION	= 66- 74 DEGR	WAVE DIRECTION	= 66- 74 DEGR
AIR TEMP	= 21.7C	CLOUD TYPE	= 8
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1017.3 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SVR	O2	O2'	AOU	O2R	PO4	NO3	SI	N/P
0	22.63	36.22	24.98	298					.07	.7	1.6	10.0
25	22.41								.06	.7	2.2	11.7
50	20.12								.22	5.4	5.2	24.5
75	19.57								.29	6.7	5.4	23.1
100	19.06								.40	7.4	8.8	18.5
125	16.83								.65	14.6	9.6	22.5
135	13.05	34.80	26.25	181					1.21	24.1	15.4	19.9

EASTWARD CRUISE 16 STATION 10 10/ IV/75 6.9 GMT CONSECUTIVE STATION 10

LAT. = 30 9.8N LONG. = 80 26.9W DEPTH = 38M DIST LAST STA = 26.3KM

WEATHER DATA

WIND FORCE	= 5	SEA STATE	=
WIND DIRECTION	=196-204 DEGR	WAVE DIRECTION	=216-224 DEGR
AIR TEMP	= 21.1C	CLOUD TYPE	= 6
WEATHER CODE	= 1	CLOUD AMOUNT	=6
BAROMETRIC PRESSURE	= 1012.9 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.91	36.21	25.18	279					.03	.8	3.8	26.7
15	21.67								.06	.9	.9	15.0
25	21.19								.08	.4	2.9	5.0
35	19.81	36.10	25.67	234					.14	.9	3.3	6.4

EASTWARD CRUISE 16 STATION 11 10/ IV/75 8.3 GMT CONSECUTIVE STATION 11

LAT. = 30 0.0N LONG. = 80 38.5W DEPTH = 38M DIST LAST STA = 26.0KM

WEATHER DATA

WIND FORCE	= 5	SEA STATE	=
WIND DIRECTION	=196-204 DEGR	WAVE DIRECTION	=216-224 DEGR
AIR TEMP	= 21.20	CLOUD TYPE	= 6
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1013.9 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.18	35.89	25.41	257					.13	.7	4.1	5.4
10	20.11								.15	.6	1.6	4.0
20	19.78								.14	1.0	2.6	7.1
30	19.73	36.07	25.67	234					.09	1.2	3.1	13.3

EASTWARD CRUISE 16 STATION 12 10/ IV/75 13.7 GMT CONSECUTIVE STATION 12.

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = .8KM

WEATHER DATA

WIND FORCE	= 4	SEA STATE	=
WIND DIRECTION	=196-204 DEGR	WAVE DIRECTION	=196-204 DEGR
AIR TEMP	= 22.2C	CLOUD TYPE	= 8
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1013.5 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SVA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.51	36.20	25.28	270					.07	1.0	2.9	14 3
5	21.46											
10	21.43								.14	.6	1.1	4.3
15	21.38											
20	19.95											
28	19.84								.22	.4	2.8	1.8
35	19.82	36.04	25.62	238					.24	.2	4.4	.8

EASTWARD CRUISE 16 STATION 13 10/ 19/75 16.2 GMT CONSECUTIVE STATION 13

LAT. = 39 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 2	SEA STATE	=
WIND DIRECTION	=266-274 DEGR	WAVE DIRECTION	=266-274 DEGR
AIR TEMP	= 22.2C	CLOUD TYPE	= 6
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1013.5 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.23	36.23	25.39	259					.12	.7	5.8	5.8
5	20.57											
10	20.44								.20	1.1	4.5	5.5
15	20.43											
20	20.23								.17	1.0	3.0	5.9
28	19.83								.30	1.8	5.4	6.0
35	19.81	36.11	25.68	233					.21	.8	4.0	3.8

EASTWARD CRUISE 16 STATION 14 10/ IV/75 19.2 GMT CONSECUTIVE STATION 14

LAT. = 30 0.0N LONG. = 89 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 1	SEA STATE	=
WIND DIRECTION	=266-274 DEGR	WAVE DIRECTION	=266-274 DEGR
AIR TEMP	= 23.3C	CLOUD TYPE	= 6
WEATHER CODE	= 4	CLOUD AMOUNT	=7
BAROMETRIC PRESSURE	= 1012.9 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYR	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.47	36.08	25.48	251					.10	1.1	2.6	11.0
5	20.47											
10	20.38								.15	.6	2.9	4.0
15	20.15											
20	19.84								.22	.8	2.8	3.6
28	19.79								.33	1.9	2.6	5.8
35	19.78	36.14	25.71	230					.14	.9	3.5	6.4

EASTWARD CRUISE 16 STATION 15 10/ IV/75 22.1 GMT CONSECUTIVE STATION 15

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 2	SEA STATE	=
WIND DIRECTION	= 36- 44 DEGR	WAVE DIRECTION	= 36- 44 DEGR
AIR TEMP	= 22.20	CLOUD TYPE	= 7
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1010.8 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.03	36.15	25.38	260					.03	.8	2.6	26.7
5	21.03											
10	20.78								.05	.6	5.3	12.0
15	20.20											
20	19.90								.06	.4	5.4	6.7
28	19.79								.07	.7	4.4	10.0
35	19.80	36.16	25.72	229					.11	.5	6.0	4.5



EASTWARD CRUISE 16 STATION 16 11/ IV/75 1.0 GMT CONSECUTIVE STATION 16

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 4	SEA STATE	=
WIND DIRECTION	=336-344 DEGR	WAVE DIRECTION	=336-344 DEGR
AIR TEMP	= 20.0C	CLOUD TYPE	= 8
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1012.2 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.74	36.23	25.24	273					.03	.9	4.9	30.0
5	21.70											
10	21.43								.06	.8	.6	13.3
15	20.96											
20	20.04								.14		1.9	0.0
28	19.85								.17	.5	3.6	2.9
35	19.83	36.11	25.67	234					.29	.6	1.9	2.1

EASTWARD CRUISE 16 STATION 17 11/ IV/75 4.1 GMT CONSECUTIVE STATION 17

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 5	SEA STATE	=
WIND DIRECTION	= 36- 44 DEGR	WAVE DIRECTION	= 36- 44 DEGR
AIR TEMP	= 20.00	CLOUD TYPE	= 8
WEATHER CODE	= 2	CLOUD AMOUNT	= 8
BAROMETRIC PRESSURE	= 1011.9 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.47	36.20	25.30	268					.07	1.6	.6	22.9
5	21.47											
10	21.44								.12	1.1	1.6	9.2
15	20.32											
20	19.91								1.10	.9	3.7	.8
28	19.80								.18	1.5	.4	8.3
36	19.79	36.13	25.70	231					.71	8.1	2.9	11.4

EASTWARD CRUISE 16 STATION 18 11/ IV/75 7.0 GMT CONSECUTIVE STATION 18

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE = 3  
WIND DIRECTION = 36- 44 DEGR  
AIR TEMP = 20.0C  
WEATHER CODE = 6  
BAROMETRIC PRESSURE = 1011.9 MB

SEA STATE =  
WAVE DIRECTION = 36- 44 DEGR  
CLOUD TYPE = 5  
CLOUD AMOUNT =  
VISIBILITY CODE =

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2R	PO4	NO3	SI	N/P
0	21.29	36.20	25.35	263					.07	1.3	2.0	18.6
5	21.30											
10	21.12								.15	.7	1.0	4.7
15	20.11											
20	19.80								.31	.9	2.8	2.9
28	19.78								.11	.3	2.0	2.7
36	19.79	36.13	25.70	231					.23	1.2	2.6	5.2

EASTWARD CRUISE 16 STATION 19 11/ IV/75 10.1 GMT CONSECUTIVE STATION 19

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 2	SEA STATE	=
WIND DIRECTION	=106-114 DEGR	WAVE DIRECTION	= 86- 94 DEGR
AIR TEMP	= 19.4C	CLOUD TYPE	= 5
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1006.1 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SWA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.63	36.23	25.27	270					.06	.7	.3	11.7
5	21.64											
10	21.58								.11	.4	.9	3.6
15	20.80											
20	19.85								.06	.4	.8	6.7
28	19.82								.23	.7	1.2	3.0
36	19.82	36.14	25.79	231					.18	.7	1.9	3.9

EASTWARD CRUISE 16 STATION 20 11/ IV/75 13.1 GMT CONSECUTIVE STATION 20

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE = 3  
WIND DIRECTION =176-184 DEGR  
AIR TEMP = 21.1C  
WEATHER CODE = 6  
BAROMETRIC PRESSURE = 1006.4 MB

SEA STATE =  
WAVE DIRECTION =176-184 DEGR  
CLOUD TYPE = 5  
CLOUD AMOUNT =8  
VISIBILITY CODE =

OBSERVATIONS

Z	T	S	D	SVA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.66	36.03	25.11	286					.02	.4	.8	20.0
5	21.66											
10	21.59								.09	.6	.7	6.7
15	21.46											
20	21.06								.07	.4	1.2	5.7
28	19.86								.17	.4	2.9	2.4
36	19.82	36.12	25.68	233					.14	.6	2.9	4.3

EASTWARD CRUISE 16 STATION 21 11/ IV/75 16.0 GMT CONSECUTIVE STATION 21

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 5	SEA STATE	=
WIND DIRECTION	=176-184 DEGR	WAVE DIRECTION	=176-184 DEGR
AIR TEMP	= 21.7C	CLOUD TYPE	= 5
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1005.8 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.06	36.06	25.30	268					.18	.7	1.6	3.9
5	21.05											
10	21.03								.07	.7	.8	10.0
15	20.87											
20	20.40								.11	1.2	2.2	10.9
28	19.83								.18	.9	2.5	5.0
36	19.82	36.14	25.70	231					.29	.6	3.5	2.1

EASTWARD CRUISE 16 STATION 22 11/ IV/75 19.0 GMT CONSECUTIVE STATION 22

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 5	SEA STATE	=
WIND DIRECTION	=316-324 DEGR	WAVE DIRECTION	=316-324 DEGR
AIR TEMP	= 21.7C	CLOUD TYPE	= 5
WEATHER CODE	= 1	CLOUD AMOUNT	=7
BAROMETRIC PRESSURE	= 1007.1 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SVR	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.39	36.00	25.44	254					.13	.4	2.3	3.1
5	20.42											
10	20.35								.16	.7	1.8	4.4
15	20.28											
20	20.10								.18	.7	2.7	3.9
28	19.81								.17	.5	2.3	2.9
36	19.79	36.13	25.70	231					.19	.6	3.2	3.2

EASTWARD CRUISE 16 STATION 23 11/ IV/75 22.1 GMT CONSECUTIVE STATION 23

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	=316-324 DEGR	WAVE DIRECTION	=316-324 DEGR
AIR TEMP	= 21.1C	CLOUD TYPE	= 7
WEATHER CODE	= 1	CLOUD AMOUNT	=6
BAROMETRIC PRESSURE	= 1074.6 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SVR	O2	O2'	ROU	O2R	PO4	NO3	SI	N/P
0	20.36	35.83	25.32	266					.11	.5	1.3	4.5
5	20.36											
10	20.36								.12	.5	.7	4.2
15	20.35											
20	20.18								.13	.4	1.7	3.1
28	19.87								.09	.4	3.8	4.4
36	19.86	36.13	25.68	233					.12	.6	3.5	5.0



EASTWARD CRUISE 16 STATION 24 12/19/75 1.5 GMT CONSECUTIVE STATION 24

LAT. = 30 0.0N LONG. = 89 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE = 3  
WIND DIRECTION = 316-324 DEGR  
AIR TEMP = 20.0C  
WEATHER CODE = 1  
BAROMETRIC PRESSURE = 1009.8 MB

SEA STATE =  
WAVE DIRECTION = 316-324 DEGR  
CLOUD TYPE = 8  
CLOUD AMOUNT = 6  
VISIBILITY CODE =

OBSERVATIONS

Z	T	S	D	SVR	O2	O2'	ADU	O2R	PO4	NO3	SI	N/P
0	20.62	36.09	25.44	254					.07	.4	2.0	5.7
5	20.62											
10	20.63								.10	.6	2.7	6.0
15	20.57											
20	20.17								.07	.7	2.7	10.0
28	19.91								.08	.4	2.5	5.0
36	19.92	36.12	25.66	235					.07	1.2	4.6	17.1

EASTWARD CRUISE 16 STATION 25 12/ IV/75 4.0 GMT CONSECUTIVE STATION 25

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	= 36- 44 DEGR	WAVE DIRECTION	= 36- 44 DEGR
AIR TEMP	= 20.00	CLOUD TYPE	= 8
WEATHER CODE	= 7	CLOUD AMOUNT	=6
BAROMETRIC PRESSURE	= 1097.3 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.58	36.09	25.46	252					.10	1.1	1.8	11.0
5	20.57											
10	20.54								.07	1.3	1.4	18.6
15	20.41											
20	19.88								.14	1.5	2.9	10.7
28	19.83								.16	1.7	2.9	10.6
36	19.83	36.12	25.68	233					.05	.4	2.6	8.0

EASTWARD CRUISE 16 STATION 26 12/ IV/75 7.0 GMT CONSECUTIVE STATION 26

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE = 2  
WIND DIRECTION = 36- 44 DEGR  
AIR TEMP = 20.00  
WEATHER CODE = 2  
BAROMETRIC PRESSURE = 1011.2 MB

SEA STATE =  
WAVE DIRECTION = 36- 44 DEGR  
CLOUD TYPE = 6  
CLOUD AMOUNT = 8  
VISIBILITY CODE =

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.77	36.12	25.43	255					.12	1.1	.8	9.2
5	20.80											
10	20.79								.16	1.1	.9	6.9
15	20.45											
20	20.03								.10	1.1	1.6	11.0
28	19.82								.14	1.6	2.8	11.4
36	19.79	36.13	25.70	231					.26	.8	3.0	3.1

EASTWARD CRUISE 16 STATION 27 12/ IV/75 10.2 GMT CONSECUTIVE STATION 27

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	=316-324 DEGR	WAVE DIRECTION	=316-324 DEGR
AIR TEMP	= 18.3C	CLOUD TYPE	= 6
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1011.9 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SVR	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.96	36.14	25.39	259					.09	1.9	4.6	21.1
5	20.96											
10	20.97								.05	1.0	3.5	20.0
15	20.65											
20	19.89								.07	1.3	5.4	18.6
28	19.83								.10	1.5	5.4	15.0
36	19.81	36.13	25.69	232					.16	1.8	2.2	11.3

EASTWARD CRUISE 16 STATION 28 12/ IV/75 13.1 GMT CONSECUTIVE STATION 28

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE = 4  
WIND DIRECTION =336-344 DEGR  
AIR TEMP = 19.4C  
WEATHER CODE = 1  
BAROMETRIC PRESSURE = 1014.9 MB

SEA STATE =  
WAVE DIRECTION =336-344 DEGR  
CLOUD TYPE = 8  
CLOUD AMOUNT =7  
VISIBILITY CODE =

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.98	36.12	25.37	261						1.0		
5	20.98											
10	20.98									.5	1.4	
15	20.99											
20	20.12								.10	.7	2.6	7.0
28	19.83								.05	1.7	1.0	34.0
36	19.82	36.13	25.69	232					.18	.7	2.6	3.9

EASTWARD CRUISE 16 STATION 29 12/ IV/75 16.0 GMT CONSECUTIVE STATION 29

LAT. = 30 0.9N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE = 4  
WIND DIRECTION =336-344 DEGR  
AIR TEMP = 23.3C  
WEATHER CODE = 1  
BAROMETRIC PRESSURE = 1015.6 MB

SEA STATE =  
WAVE DIRECTION =336-344 DEGR  
CLOUD TYPE = 8  
CLOUD AMOUNT =7  
VISIBILITY CODE =

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2R	PO4	NO3	SI	N/P
0	20.91	36.13	25.40	258					.10	.4	1.8	4.0
5	20.90											
10	20.91								.18	.8	2.2	4.4
15	20.43											
20	19.85								.15	.8	3.3	5.3
28	19.81								.31	.6	3.0	1.9
36	19.81	36.13	25.69	232					.15	1.7	2.7	11.3

EASTWARD CRUISE 16 STATION 30 12/ 19/75 19.0 GMT CONSECUTIVE STATION 30

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 4	SEA STATE	=
WIND DIRECTION	=336-344 DEGR	WAVE DIRECTION	=336-344 DEGR
AIR TEMP	= 22.2C	CLOUD TYPE	= 1
WEATHER CODE	= 1	CLOUD AMOUNT	=6
BAROMETRIC PRESSURE	= 1015.9 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.26	35.95	25.44	254					.09	1.4	1.6	15.6
5	20.26											
10	20.19								.19	4.0	3.6	21.1
15	20.10											
20	19.88								.18	1.0	3.8	5.6
28	19.85								.20	1.9	3.3	9.5
36	19.87	36.13	25.68	233					.15	1.9	2.6	12.7

EASTWARD CRUISE 16 STATION 31 12/ 14/75 22.2 GMT CONSECUTIVE STATION 31

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	=356-364 DEGR	WAVE DIRECTION	=356-364 DEGR
AIR TEMP	= 22.2C	CLOUD TYPE	= 8
WEATHER CODE	= 1	CLOUD AMOUNT	=5
BAROMETRIC PRESSURE	= 1015.6 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.48								0.00	.1	.7	
5	21.48											
10	21.10								.05	0.0	1.8	0.0
15	20.34											
20	19.99								.05	.4	1.1	8.0
28	19.91								.18	.4	1.8	2.2
36	19.88	36.12	25.66	235					.23	.7	1.5	3.0



EASTWARD CRUISE 16 STATION 32 13/ IV/75 1.1 GMT CONSECUTIVE STATION 32

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 2	SEA STATE	=
WIND DIRECTION	=356-364 DEGR	WAVE DIRECTION	=356-364 DEGR
AIR TEMP	= 21.1C	CLOUD TYPE	= 8
WEATHER CODE	= 1	CLOUD AMOUNT	=6
BAROMETRIC PRESSURE	= 1020.0 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SVA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.08	36.08	25.31	267					0.00	.4	6.1	
5	21.10											
10	21.06								.04	.6	7.0	15.0
15	20.69											
20	19.89											
28	19.84								.22	.2	2.8	.9
36	19.84	36.12	25.68	233					.28	.8	2.7	2.9

EASTWARD CRUISE 16 STATION 33 13/ IV/75 4.0 GMT CONSECUTIVE STATION 33

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE = 2  
WIND DIRECTION =356-364 DEGR  
AIR TEMP = 18.3C  
WEATHER CODE = 1  
BAROMETRIC PRESSURE = 1019.0 MB

SEA STATE =  
WAVE DIRECTION =356-364 DEGR  
CLOUD TYPE = 8  
CLOUD AMOUNT =6  
VISIBILITY CODE =

OBSERVATIONS

Z	T	S	D	SVR	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	20.76	36.06	25.38	260					.04	.7	0.0	17.5
5	20.79											
10	20.79								.51	3.0	.9	5.9
15	20.53											
20	19.92								.16	1.4	2.5	8.8
28	19.92								.09	.7	2.0	7.8
36	19.88	36.12	25.66	235					.05	1.0	18.4	20.0

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EASTWARD CRUISE 16 STATION 34 13/ IV/75 6.9 GMT CONSECUTIVE STATION 34

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE = 2  
WIND DIRECTION = 356-364 DEGR  
AIR TEMP = 18.9C  
WEATHER CODE = 1  
BAROMETRIC PRESSURE = 1019.0 MB

SEA STATE =  
WAVE DIRECTION = 356-364 DEGR  
CLOUD TYPE = 8  
CLOUD AMOUNT =  
VISIBILITY CODE =

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	ADU	O2A	PO4	NO3	SI	N/P
0	21.01	36.08	25.33	265					.24	.4	1.8	1.7
5	21.02											
10	20.96								0.00	0.0	1.4	
15	20.23											
20	20.13								.08	.8	.9	10.0
28	20.11								.14	1.0	1.9	7.1
36	20.08	36.12	25.61	239					.09	.4	1.6	4.4

EASTWARD CRUISE 16 STATION 35 13/ IV/75 10.2 GMT CONSECUTIVE STATION 35

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	=356-364 DEGR	WAVE DIRECTION	=356-364 DEGR
AIR TEMP	= 18.3C	CLOUD TYPE	= 8
WEATHER CODE	= 1	CLOUD AMOUNT	=
BAROMETRIC PRESSURE	= 1019.3 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.14	36.11	25.32	266					.02	.4	3.9	20.0
5	21.14											
10	21.14								.01	.7	3.0	70.0
15	20.18											
20	20.13								.03	.9	4.5	30.0
28	20.10								.05	.1	.7	2.0
36	20.09	36.12	25.61	239					.05	.4	1.1	8.0

EASTWARD CRUISE 16 STATION 36 13/ IV/75 13.0 GMT CONSECUTIVE STATION 36

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	=356-364 DEGR	WAVE DIRECTION	=356-364 DEGR
AIR TEMP	= 20.6C	CLOUD TYPE	=
WEATHER CODE	= 0	CLOUD AMOUNT	=0
BAROMETRIC PRESSURE	= 1020.7 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SVR	O2	O2'	AOU	O2R	PO4	NO3	SI	N/P
0	21.09	36.09	25.32	266					.02	.6	.7	30.0
5	21.11											
10	21.10								0.00	.1	2.5	
15	20.77											
20	20.07								.15	.4	.9	2.7
28	20.01								.15	.9	1.5	6.0
36	20.01	36.12	25.63	238					.12	.4	2.5	3.3

EASTWARD CRUISE 16 STATION 37 13/ IV/75 15.6 GMT CONSECUTIVE STATION 37

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 38M DIST LAST STA = 0.0KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	=356-364 DEGR	WAVE DIRECTION	=356-364 DEGR
AIR TEMP	= 22.8C	CLOUD TYPE	=
WEATHER CODE	= 0	CLOUD AMOUNT	=0
BAROMETRIC PRESSURE	= 1023.0 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	ADU	O2A	PO4	NO3	SI	N/P
0	21.36	36.06	25.22	275					.01	.4	1.4	40.0
5	21.34											
10	21.29								.03	.4	.4	13.3
15	20.58											
20	20.09								.06	.4	1.6	6.7
28	20.04								.08	.4	1.4	5.0
36	20.04	36.12	25.62	239					.18	1.2	2.2	6.7

EASTWARD CRUISE 16 STATION 38 13/ IV/75 20.7 GMT CONSECUTIVE STATION 38  
 LAT. = 30 0.0N LONG. = 81 12.5W DEPTH = 13M DIST LAST STA = 55.4KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	=356-364 DEGR	WAVE DIRECTION	=356-364 DEGR
AIR TEMP	= 22.8C	CLOUD TYPE	= 8
WEATHER CODE	= 1	CLOUD AMOUNT	=
BAROMETRIC PRESSURE	= 1020.3 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	18.93	33.59	23.98	393					.26	.4	2.5	1.5
8	18.97								.38	1.1	3.2	2.9
12	18.96	33.57	23.96	396					.38	1.1	3.2	2.9

EASTWARD CRUISE 16 STATION 39 13/ IV/75 22.2 GMT CONSECUTIVE STATION 39

LAT. = 30 0.9N LONG. = 81 1.2W DEPTH = 21M DIST LAST STA = 18.1KM

WEATHER DATA

WIND FORCE = 3  
WIND DIRECTION = 36- 44 DEGR  
AIR TEMP = 21.7C  
WEATHER CODE = 1  
BAROMETRIC PRESSURE = 1020.0 MB

SEA STATE =  
WAVE DIRECTION = 356-364 DEGR  
CLOUD TYPE = 8  
CLOUD AMOUNT =  
VISIBILITY CODE =

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2R	PO4	NO3	SI	N/P
0	19.47	34.70	24.69	326					.26	.1	1.8	.4
5	19.44											
10	19.42								.25	.1	1.4	.4
15	19.24								.18	.7	2.2	3.9
20	19.17	34.58	24.68	327					.11	.4	1.2	3.6



EASTWARD CRUISE 16 STATION 40 14/ IV/75 0.0 GMT CONSECUTIVE STATION 40

LAT. = 30 0.0N LONG. = 80 49.5W DEPTH = 27M DIST LAST STA = 18.8KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	= 36- 44 DEGR	WAVE DIRECTION	= 36- 44 DEGR
AIR TEMP	= 21.1C	CLOUD TYPE	= 8
WEATHER CODE	= 1	CLOUD AMOUNT	=
BAROMETRIC PRESSURE	= 1020.7 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	ADU	O2A	PO4	NO3	SI	N/P
0	20.83	35.90	25.24	273					.15	1.0	1.6	6.7
5	20.75											
10	20.35								.09	.1	1.0	1.1
18	20.30								.05	1.1	1.4	22.0
26	20.29								.08	.3	.7	3.8

EASTWARD CRUISE 16 STATION 41 14/ IV/75 1.7 GMT CONSECUTIVE STATION 41

LAT. = 30 0.0N LONG. = 80 38.0W DEPTH = 35M DIST LAST STA = 18.5KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	= 36- 44 DEGR	WAVE DIRECTION	= 36- 44 DEGR
AIR TEMP	= 20.6C	CLOUD TYPE	= 8
WEATHER CODE	= 1	CLOUD AMOUNT	=
BAROMETRIC PRESSURE	= 1022.7 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	21.32	36.18	25.32	266					.01	.3	1.6	30.0
5	21.37								.05	.7	1.1	14.0
10	20.30								.04		.8	
20	20.06								.27	.7	1.9	2.6
26	20.05								.18	.6	1.6	3.3
34	20.04	36.12	25.62	238					.10	1.0	1.4	10.0

EASTWARD CRUISE 16 STATION 42 14/ IV/75 3.5 GMT CONSECUTIVE STATION 42

LAT. = 30 0.0N LONG. = 80 26.2W DEPTH = 42M DIST LAST STA = 18.9KM

WEATHER DATA

WIND FORCE	= 3	SEA STATE	=
WIND DIRECTION	=136-144 DEGR	WAVE DIRECTION	=136-144 DEGR
AIR TEMP	= 20.6C	CLOUD TYPE	= 8
WEATHER CODE	= 2	CLOUD AMOUNT	=8
BAROMETRIC PRESSURE	= 1022.4 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	AOU	O2A	PO4	NO3	SI	N/P
0	22.61	35.66	24.57	337					.04	.3	1.4	7.5
5	22.31								.07	0.0	4.0	
10	21.80								.04	.9	.7	22.5
20	21.60								0.00	.1	.5	
30	20.41								.04	.3	0.0	7.5
40	20.21	36.12	25.58	242					.06	.2	2.4	3.3

EASTWARD CRUISE 16 STATION 43 14/ IV/75 5.4 GMT CONSECUTIVE STATION 43

LAT. = 30 0.9N LONG. = 80 15.2W DEPTH = 101M DIST LAST STA = 17.7KM

WEATHER DATA

WIND FORCE	= 4	SEA STATE	=
WIND DIRECTION	=106-114 DEGR	WAVE DIRECTION	=106-114 DEGR
AIR TEMP	= 21.7C	CLOUD TYPE	= 9
WEATHER CODE	= 2	CLOUD AMOUNT	=
BAROMETRIC PRESSURE	= 1020.3 MB	VISIBILITY CODE	=

OBSERVATIONS

Z	T	S	D	SYA	O2	O2'	ADU	O2A	PO4	NO3	SI	N/P
0	24.41	36.27	24.50	344					.28	1.2	2.5	4.3
5	24.43											
8	24.43								.04	1.4	.9	35.0
20	22.94								.05	1.5	1.0	30.0
30	21.68								.11	3.6	5.1	32.7
40	20.83								.19	4.4	1.8	23.2
50	20.49								.27	5.1	2.8	18.9
75	19.18								.43	9.3	5.7	21.6
100	16.41	35.05	25.71	232					.69	13.4	6.0	19.4

APPENDIX C  
SURFACE CURRENTS

## CURRENT METER OBSERVATIONS

Date/Time	Speed (cm/sec)	Direction	East Component	North Component
Apr 10, 1975/0630	15.4	360	0	15
1030	4.6	090	5	0
1045	5.2	090	5	0
1100	5.2	090	5	0
1145	5.2	100	5	-1
1300	5.2	225	-4	-4
1315	4.1	180	0	-5
1330	5.2	220	-3	-4
1345	5.7	220	-4	-4
1400	4.1	230	-3	-3
1415	5.2	230	-4	-3
1430	5.2	240	-4	-3
1445	5.2	270	-5	0
1500	4.6	225	-3	-3
1515	41.2	280	-41	7
1530	7.7	270	-8	0
1745	5.2	280	-5	.1
1900	6.2	310	-5	4
1915	6.2	315	-4	4
1930	7.7	340	-3	+7
1945	5.2	340	-2	+5
2000	6.2	325	-4	+5
2015	8.2	360	0	+8
2030	7.2	360	0	+7
2045	6.2	360	0	6
2145	4.1	360	0	4
2200	4.6	060	4	2
2215	5.2	040	3	4
2230	5.2	040	3	4
2245	5.2	125	4	-3
2300	5.2	125	4	-3
2315	5.2	100	5	-1
2330	5.2	130	4	-3
2345	5.2	135	4	-4
2400	5.2	140	3	-4
Apr 11, 1975/0015	5.2	170	-1	-5
0030	9.3	190	-2	-9
0045	5.2	170	-1	-5
0100	5.2	170	-1	-5
0115	5.2	170	-1	-5
0130	15.4	140	10	-12
0145	15.4	180	0	-15
0200	10.3	230	-8	-7
0215	18.0	190	-3	-18
0230	9.3	250	-9	-3
0245	5.2	270	-5	0

Date/Time	Speed (cm/sec)	Direction	East Component	North Component
Apr 11,1975/0300	10.3	140	7	-8
0315	5.2	300	-4	3
0330	5.2	300	-4	+3
0345	5.7	315	-4	4
0400	18.0	315	-13	+13
0415	25.7	320	-12	14
0430	36.0	320	-23	28
0445	38.6	315	-27	27
0500	51.2	320	-33	39
0515	6.2	315	-4	4
0530	9.3	320	-6	7
0630	30.9	315	-22	22
0645	43.8	330	-22	38
0700	41.2	320	-26	32
0715	30.9	330	-15	27
0730	41.2	340	-14	39
0745	36.0	340	-12	34
0800	30.9	360	0	31
0815	36.0	360	0	36
0830	41.2	360	0	41
0845	46.3	360	0	46
0900	30.9	360	0	31
0915	46.3	360	0	46
0930	38.6	010	7	38
0945	41.2	010	7	41
1000	25.7	020	9	24
1015	51.5	030	26	45
1030	51.5	040	33	39
1045	15.4	030	8	.3
1100	61.8	030	31	54
1115	77.2	040	50	59
1130	61.8	040	40	47
1145	67.0	045	47	47
1200	61.8	040	40	47
1230	51.5	040	33	39
1245	46.4	055	38	27
1300	46.4	110	44	-16
1315	36.0	090	36	0
1330	41.2	090	41	0
1345	30.9	110	29	-11
1400	36.0	100	36	-6
1415	30.9	100	30	-5
1430	20.6	140	13	-16
1445	30.9	180	0	-31
1515	30.9	180	0	-31
1530	30.9	190	-5	-30
1545	56.6	220	-36	-43
1600	25.8	220	-17	-20
1615	25.8	270	-26	0

Date/Time	Speed (cm/sec)	Direction	East Component	North Component
Apr 11, 1975/1630	25.8	290	-24	9
1645	30.9	220	-30	5
1700	25.8	290	-24	9
1715	25.8	310	-20	17
1730	25.8	315	-18	18
1745	15.4	320	-10	12
1800	30.9	320	-20	24
1815	30.9	340	-11	29
1830	25.8	315	-18	18
1845	25.8	340	-9	24
1900	25.8	330	-13	22
1915	25.8	320	-17	20
1930	25.8	350	-4	25
1945	25.8	360	0	26
2000	5.2	330	-3	4
2015	25.8	360	0	26
2030	25.8	350	-4	25
2045	15.4	360	0	15
2100	20.6	360	0	21
2145	20.6	180	0	-21
2200	25.8	190	-4	-25
2215	20.6	180	0	-21
2230	30.9	190	-5	-30
2245	41.2	180	0	-41
2300	30.9	180	0	-31
2315	30.9	180	0	-31
2330	30.9	190	-5	-30
2345	36.1	180	0	-36
2400	41.2	180	0	-41
Apr 12, 1975/0015	41.2	190	-7	-41
0030	36.0	190	-6	-36
0045	36.0	190	-6	-36
0100	30.9	220	-20	-24
0115	30.9	190	-5	-30
0130	30.9	220	-20	-24
0145	30.9	190	-5	-30
0200	30.9	220	-20	-24
0215	30.9	230	-24	-20
0230	36.0	220	-23	-28
0245	36.0	230	-28	-23
0300	36.0	220	-23	-28
0315	36.0	260	-36	-6
0330	36.0	270	-36	0
0345	41.2	270	-41	0
0400	36.0	280	-36	0
0415	30.9	300	-27	15
0430	41.2	300	-36	21
0445	41.2	280	-41	7



Date/Time	Speed (cm/sec)	Direction	East Component	North Component
Apr 12, 1975/0500	36.0	280	-36	6
0515	41.2	300	-36	21
0530	41.2	290	-39	14
0545	41.2	320	-26	32
0600	46.3	315	-33	33
0630	46.3	360	0	46
0645	51.5	340	-18	48
0700	41.2	360	0	41
0715	30.9	350	-5	30
0730	36.0	350	-6	36
0745	30.9	360	0	31
0800	30.9	350	-5	30
0815	30.9	350	-5	30
0830	25.8	360	0	26
0845	25.8	360	0	26
0930	20.6	180	0	-21
0945	20.6	170	4	-20
1000	30.9	180	0	-31
1015	30.9	180	0	-31
1030	41.2	180	0	-31
1045	30.9	200	-11	-29
1100	36.0	190	-6	-36
1115	41.2	180	0	-41
1130	41.2	220	-26	-32
1145	46.3	220	-30	-36
1200	46.4	210	-23	-40
1215	41.2	210	-21	-36
1230	51.5	210	-26	-45
1245	51.5	220	-33	-39
1300	51.5	230	-39	-33
1315	61.8	260	-61	-11
1330	46.4	220	-30	-36
1345	51.5	260	-51	-9
1400	56.6	250	-53	-19
1415	51.5	230	-39	-33
1430	51.5	270	-52	0
1445	51.5	270	-52	0
1515	51.5	270	-52	0
1530	36.0	270	-36	0
1545	51.5	270	-52	0
1600	56.6	280	-56	10
1615	51.5	290	-48	18
1630	46.4	270	-46	0
1645	41.2	270	-41	0
1700	51.5	310	-39	33
1715	56.6	310	-43	36
1730	61.8	320	-40	47

Date/Time	Speed (cm/sec)	Direction	East Component	North Component
Apr 12,1975/1800	46.4	320	-30	36
1830	51.5	320	-33	39
1845	51.5	320	-33	39
1900	56.6	320	-36	43
1915	61.8	320	-40	47
1930	61.8	320	-40	47
1945	51.5	320	-33	39
2000	51.5	320	-33	39
2015	51.5	320	-33	39
2030	46.4	320	-30	36
2045	36.0	330	-18	31
2130	15.4	350	-3	15
2145	10.3	360	0	10
2200	7.7	360	0	8
2215	5.2	360	0	5
2230	10.3	090	10	0
2245	10.8	090	11	0
2300	4.6	090	5	0
2315	15.4	100	15	-3
2330	20.6	135	15	-15
2345	20.6	140	13	-16
2400	25.8	130	20	-17
Apr 13,1975/0015	30.9	180	0	-31
0030	36.0	170	6	-36
0045	36.0	170	6	-36
0100	36.0	170	6	-36
0115	36.0	170	6	-36
0130	46.4	170	8	-46
0145	36.0	180	0	-36
0200	25.8	180	0	-26
0215	36.0	220	-23	-28
0230	36.0	200	-12	-34
0245	30.1	230	-24	-20
0300	30.9	190	-5	-30
0315	36.0	220	-23	-28
0330	41.2	180	0	-41
0345	30.9	220	-20	-24
0400	25.8	220	-17	-20
0415	25.8	270	-26	0
0430	25.8	230	-20	-17
0445	30.9	250	-29	-11
0500	30.9	270	-31	0
0515	25.8	270	-26	0
0530	30.9	280	-30	5
0545	25.75	310	-20	17
0630	36.0	320	-23	28
0645	30.9	310	-24	20
0700	30.9	320	-20	24
0715	36.0	360	0	36

Date/Time	Speed (cm/sec)	Direction	East Component	North Component
Apr 13,1975/0730	15.4	320	-10	12
0745	36.0	320	-23	28
0800	30.9	310	-24	20
0815	20.6	320	-13	16
0830	15.4	320	-10	12
0845	15.4	320	-10	12
0900	20.6	310	-16	13
0930	15.4	320	-10	12
0945	20.6	310	-16	13
1000	2.6	300	-2	1
1015	25.8	270	-26	0
1030	25.8	220	-17	-20
1045	20.6	260	-20	-4
1100	20.6	250	-19	-7
1115	25.8	220	-17	-20
1130	25.8	200	-9	-24

APPENDIX D  
CHLOROPHYLL OBSERVATIONS

Chlorophyll a Transect and Anchor Station

Date	Distance from shore km	Station	Depth	Chlorophyll <u>a</u> mg m <sup>-3</sup>
4-9-75	35	1	5	.53
			10	.60
			25	1.44
	15	5	5	.32
			10	.46
			20	.83
	35	7	5	.09
			15	.08
			25	.64
30			1.72	
4-10-75	55	9	5	.07
			25	.09
			50	.60
			75	.40
			100	.56
			120	.25
			135	.13
4-12-75	5	38	5	--
			11	.91
	15	39	5	.63
			10	.58
			20	2.78
	25	40	5	.21
			10	.45
			26	.49
	35	41	5	.09
			10	.09
			34	1.94
	45	42	5	.07
			10	.10
			20	.09
			40	.24
55	43	5	.05	
		20	.13	
		50	.06	

Date	Distance from shore km	At Anchor Station Time	Depth	Chlorophyll <u>a</u> mg m <sup>-3</sup>
4-10-75	35	0930	5	.13
			20	1.72
			35	2.47
		1500	5	.85
			20	2.85
			35	2.60
		2100	5	.12
			20	.84
			35	2.00
4-11-75	35	0900	5	.08
			20	1.40
			35	1.80
		1500	5	.68
			20	.98
			36	2.96
		2100	3	.33
			20	.60
			36	1.22
4-12-75	35	0900	5	.16
			20	1.14
			36	1.74
		1500	5	.21
			20	1.78
			36	2.58
		2100	5	.15
			20	.65
			36	3.60
4-13-75	35	0900	5	.13
			20	2.09
			36	2.30

Integrated Chlorophyll a at Anchor Station  
and Some Surrounding Stations

Station	Month-Day	Time	Distance from shore (km)	Integrated Chlorophyll <u>a</u> mg m <sup>-2</sup>
7 (anchor)	4-10	0930	35	56.9
7 (anchor)	4-10	1500	35	85.9
7 (anchor)	4-10	2100	35	39.1
7 (anchor)	4-11	0900	35	44.5
7 (anchor)	4-11	1500	35	62.2
7 (anchor)	4-11	2100	35	33.4
7 (anchor)	4-12	0900	35	42.3
7 (anchor)	4-12	1500	35	63.8
7 (anchor)	4-12	2100	35	76.8
7 (anchor)	4-13	0900	35	47.1
7 (anchor)	4-13	-	35	-
7 (anchor)	4-13	2100	35	36.8
5*	4-9	1650	15	18.5
39	4-13	1820	15	46.7
40	4-13	2000	25	9.9
1	4-9	0800	35	29.5
42	4-13	2350	45	2.8
9	4-10	0020	55	44.9
43	4-14	0140	55	5.1

\*See Figure 1 for station locations.

APPENDIX E  
ZOOPLANKTON OBSERVATIONS DURING THE  
ANCHOR STATION



Zooplankton 10 April 1975

1530	1830	2120 hours
(organisms m <sup>-3</sup> )		

Dolioletta	17.9	198.1	628.2
Thalia democratica blastozoid	1.1	15.7	35.1
T. democratica oozoid	1.1	5.0	3.7
T. democratica total	2.3	21.4	39.8
Larvacea	1.2	73.6	157.6
Copepods	5.0	154.1	311.6
Chaetognatha	.3	14.5	38.3
Cladocera	-	1.3	3.2
Ostracoda	-	-	.4

Copepod

Centropages	-	.1	-
Copilia	-	.1	.4
Corycaeus	.4	4.0	43.2
Eucalanus	.8	.4	8.6
Euchaeta	.1	-	5.8
Nannocalanus	.4	1.5	27.3
Oithona	-	.4	53.3
Oncaea	.1	.4	64.5
Paracalanus	1.9	9.3	249.2
Rhincalanus	-	.1	5.4
Sapphirina	.2	-	5.0
Temora	-	.2	14.0
Undinula	-	.9	2.6

Zooplankton	11 April 1975	0620	0915	1220	1515	1820	2125	0630 hrs
Dolioletta		138.3	138.0	512.0	1030.0	283.6	494.0	185.4
Thalia democratica								
blastozoid		30.3	11.6	15.7	48.9	21.6	33.2	33.3
T. democratica oozoid		15.7	5.2	1.9	8.1	5.5	1.5	9.9
T. democratica total		46.0	16.8	17.6	57.0	36.1	34.7	43.2
Larvacea		92.8	11.8	49.6	32.4	4.2	64.2	114.5
Copepods		350.8	95.9	231.9	75.3	29.3	624.6	437.8
Chaetognatha		28.6	13.98	37.3	16.28	1.68	21.8	2.5
Cladocera		5.9	0.9	1.4	-	-	1.2	4.8
Ostracoda		0.4	-	-	-	-	-	-
<u>Copepod</u>								
Centropages		2.1	-	-	2.6	-	0.5	6.9
Copilia		-	-	.8	-	-	-	-
Corycaeus		30.7	44.4	9.8	38.7	12.2	10.9	23.2
Eucalanus		47.1	57.1	14.7	41.3	-	.8	41.3
Euchaeta		2.1	3.2	4.1	2.6	-	.2	2.3
Nannocalanus		43.0	95.1	4.1	15.5	-	-	11.5
Oithona		24.6	28.5	9.0	12.9	6.1	.5	2.3
Oncaea		69.6	88.8	7.4	20.7	6.1	1.2	34.4
Paracalanus		112.5	107.8	26.9	136.8	30.5	18.8	160.5
Rhincalanus		4.1	-	-	2.6	-	0.2	-
Sapphirina		6.1	12.7	1.6	-	4.1	1.2	-
Temora		14.3	25.4	1.6	10.3	4.1	2.0	27.5
Undinula		2.1	6.3	1.6	2.6	.3	.2	6.9

Zooplankton	12 April 1975	0620	0915	1215	1505	1820	2115 hours
Dolioletta		822.0	1561.4	523.3	430.5	565.1	263.9
Thalia democratica							
blastozoid		50.0	14.8	16.3	12.6	29.9	.7
T. democratica oozoid		6.7	3.4	2.3	9.4	10.0	1.7
T. democratica total		56.7	18.2	18.6	22.0	39.9	2.4
Larvacea		201.0	86.4	114.0	52.0	6.4	9.7
Copepods		837.5	264.8	279.1	222.4	105.2	33.8
Chaetognatha		62.5	26.1	34.9	19.7	15.4	-
Cladocera		8.7	2.3	2.3	-	.9	-
<u>Copepods</u>							
Centropages		3.9	3.4	-	1.8	-	-
Copilia		3.9	-	-	-	-	-
Corycaeus		30.8	19.3	20.9	23.3	45.4	1.7
Eucalanus		30.8	2.3	18.6	19.7	2.7	1.7
Euchaeta		3.9	-	1.2	-	1.8	-
Nannocalanus		73.1	5.7	-	1.8	13.6	.7
Oithona		30.8	20.5	22.1	17.9	2.7	-
Oncaea		126.9	10.2	18.6	5.4	-	1.3
Paracalanus		396.2	118.2	146.5	100.5	21.8	21.1

Copepods 12 April 1975 0620 0915 1215 1505 1820 2115 hours

Rhincalanus	-	1.1	-	1.8	1.8	.7
Sapphirina	3.9	1.1	-	1.8	.9	.3
Temora	73.1	17.1	-	7.2	.9	-
Undinula	15.4	2.3	-	.8	-	-

Zooplankton 13 April 1975 0920 0935 1140 1150 hours

Dolioletta	58.7	415.9	28.6	26.4
Thalia democratica blastozoid	18.3	2.9	3.6	4.2
T. democratica oozoid	2.1	2.9	.6	.2
T. democratica total	20.4	5.8	4.2	4.4
Larvacea	11.7	21.7	13.9	14.8
Copepods	119.7	214.5	72.3	79.6
Chaetognatha	13.6	23.2	11.0	20.0
Cladocera	.1	-	-	.3

Copepods

Centropages	-	-	0.2	-
Copilia	-	1.5	-	-
Corycaeus	1.0	17.4	1.5	.5
Eucalanus	1.2	15.9	1.4	3.1
Euchaeta	.7	5.8	.7	1.5
Nannocalanus	2.4	7.3	1.0	.4
Oithona	6.1	34.8	2.3	1.9
Oncaea	.3	20.3	.3	.1
Paracalanus	5.1	85.5	4.3	-
Rhincalanus	.1	5.8	.1	.1
Sapphirina	.3	1.5	-	.1
Temora	.3	7.3	1.1	.3
Undinula	1.4	4.4	.8	1.0