

# DAMOS

## DISPOSAL AREA MONITORING SYSTEM

### ANNUAL DATA REPORT - 1978

SUPPLEMENT I

WESTERN LONG ISLAND SOUND DISPOSAL SITES

*Naval Underwater Systems Center*  
*Newport, Rhode Island*

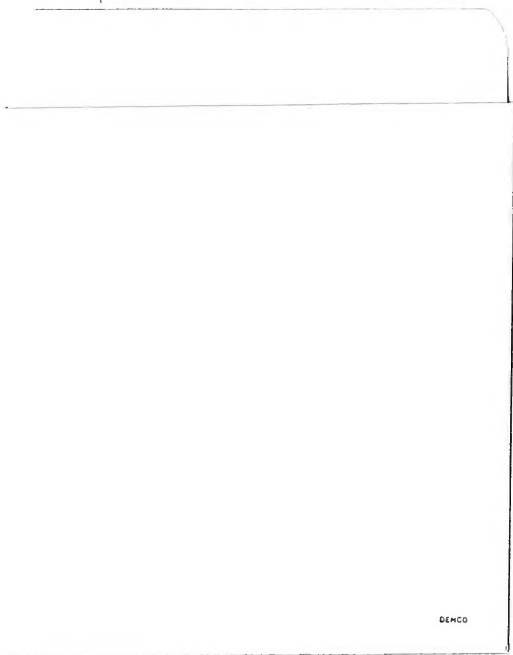


New England Division  
Corps of Engineers  
Waltham, Massachusetts

May 1979

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187  
N45  
1978  
suppl. I

1000



DEMO

DAMOS

DISPOSAL AREA MONITORING SYSTEM  
ANNUAL DATA REPORT - 1978

SUPPLEMENT I  
SITE REPORT - WESTERN LONG  
ISLAND SOUND SITES

Naval Underwater Systems Center  
Newport, Rhode Island

New England Division  
Corps of Engineers  
Waltham, Massachusetts

May 1979



DISPOSAL AREA  
MONITORING SYSTEM  
SITE LOCATIONS

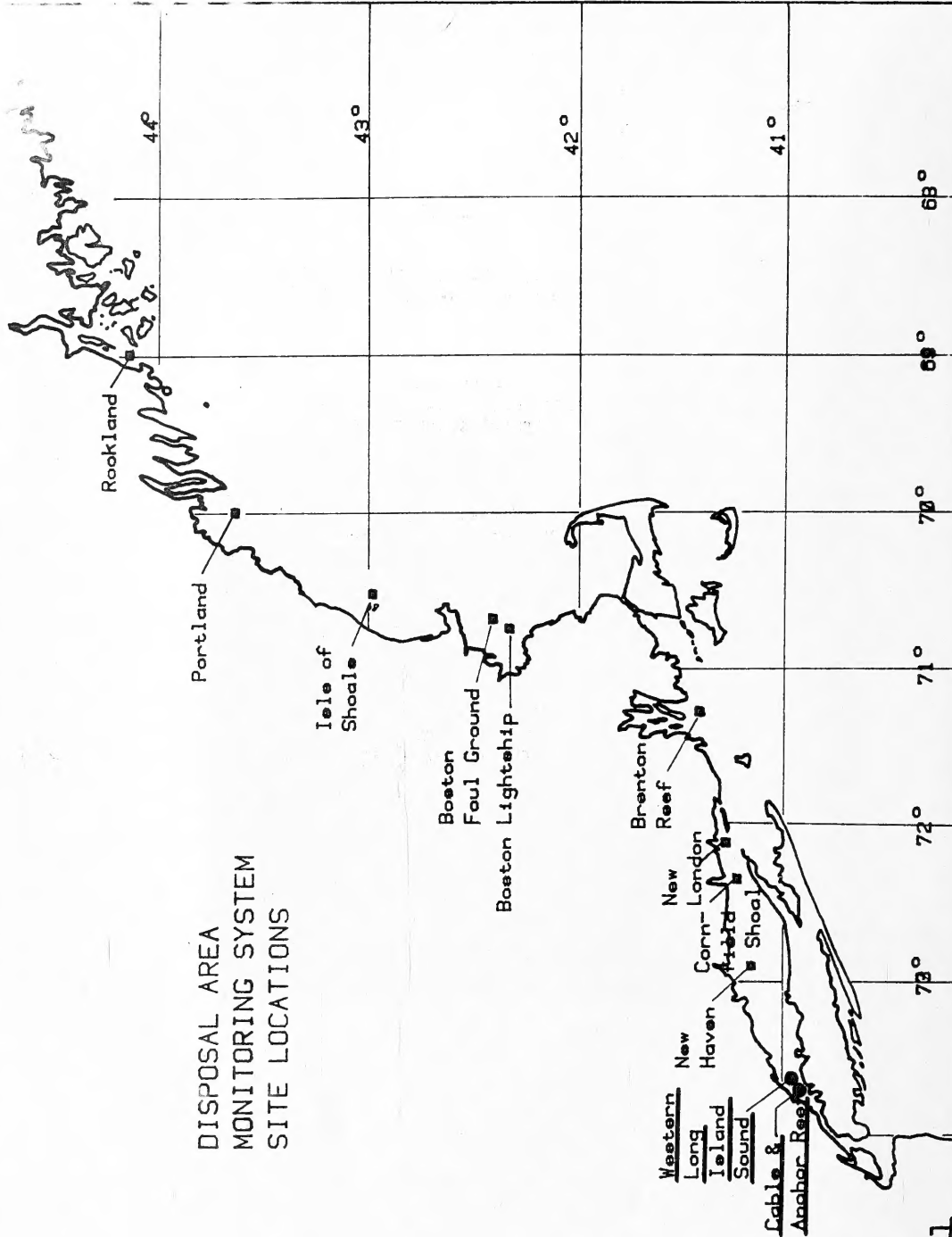


FIG.-1

## DISPOSAL AREA MONITORING SYSTEM

This is one of a series of site specific data reports resulting from the DAMOS program, now two years in progress. DAMOS is the culmination of nearly a decade of prior study efforts, actually preceding NEPA, which have been directed towards the understanding of the effects of and the responsible management of the ocean disposal of dredged materials in New England waters as they fall under the authority of the New England Division of the Corps of Engineers. The individual site reports henceforth will be updated approximately on an annual bases as additional knowledge is gained, at least with respect to those sites where significant disposal activities will have occurred.

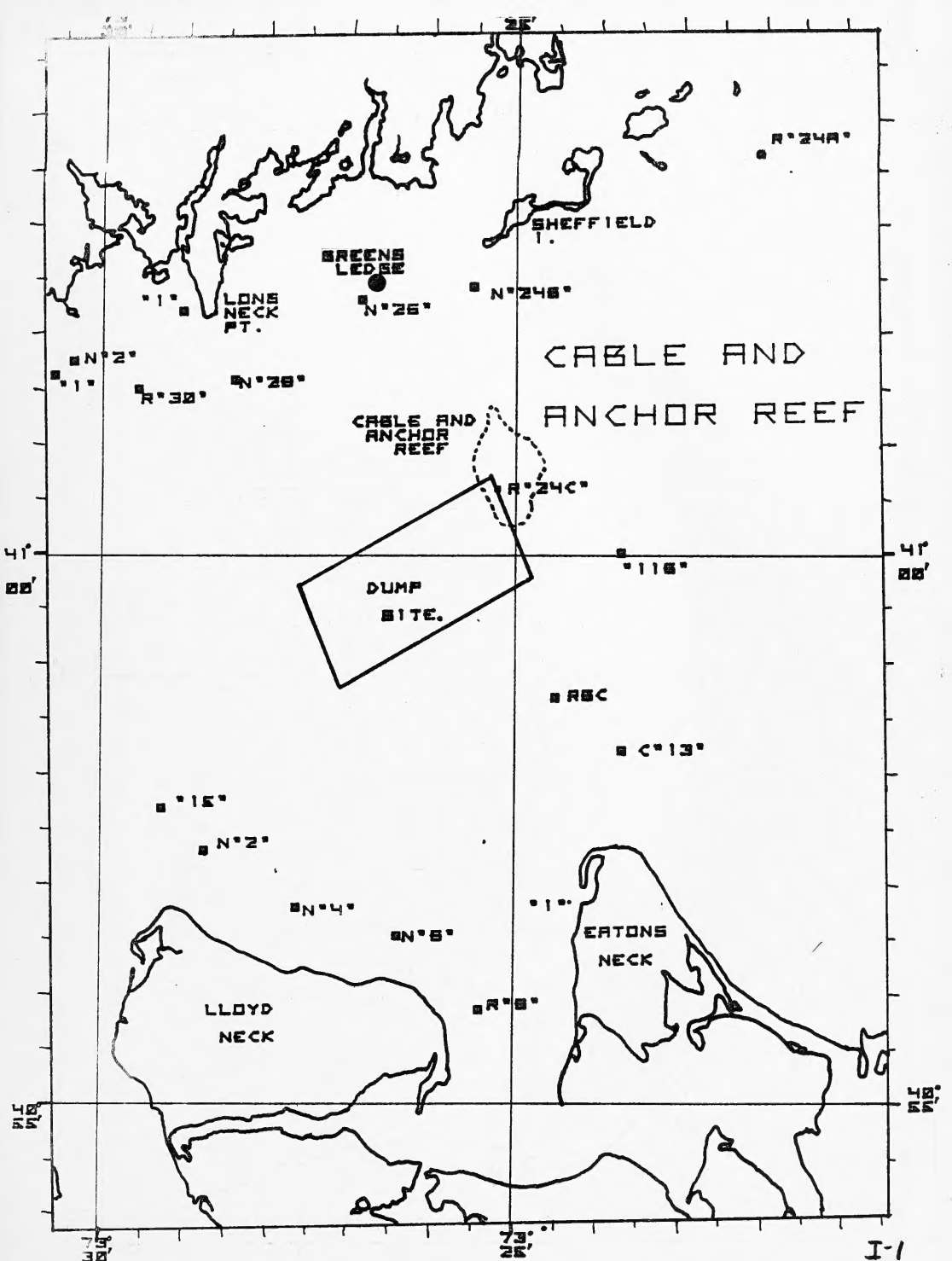
## WESTERN LONG ISLAND SOUND

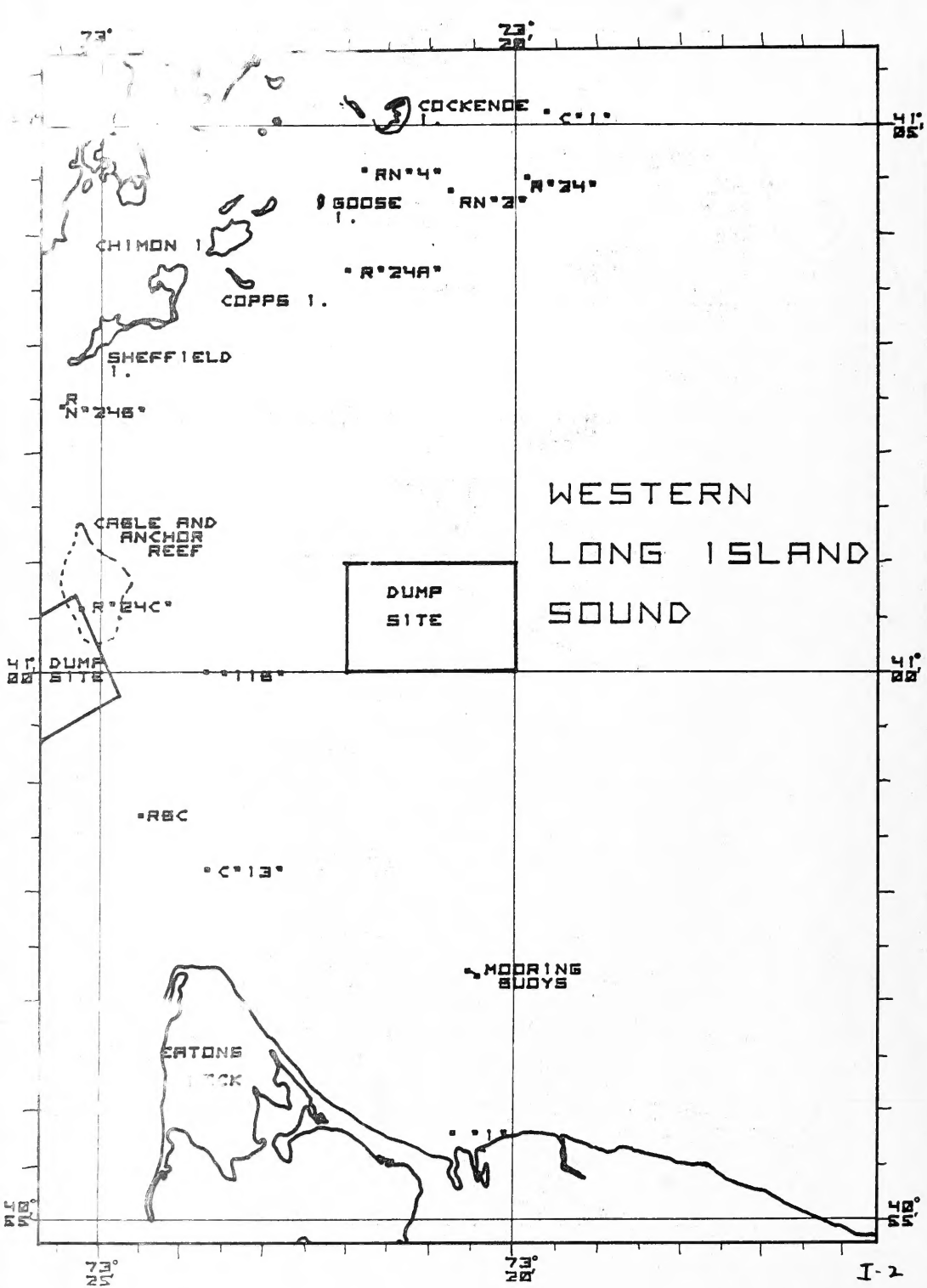
Disposal of dredge spoils from harbors in the Western Long Island Sound area has taken place at the Cable and Anchor Reef site (Fig. I-1) since the beginning of the twentieth century. A rough estimate of 10 million cubic meters of spoil had been dumped at this site through 1973, most of which resulted from maintenance dredging of surrounding harbors. This site has become a major lobstering area and therefore, no longer suitable for future disposal of spoils.

An alternative to the Cable and Anchor Reef site has been proposed by a combination of state and federal agencies in a depression two miles east of the original area. This Western Long Island Sound disposal site (Fig. I-2) is being studied as part of the DAMOS program to provide background data should a requirement for a disposal area arise in the future. Meanwhile, a somewhat reduced monitoring effort will be conducted at the Cable and Anchor Reef site to provide continuity for long term effects.

### Bathymetry

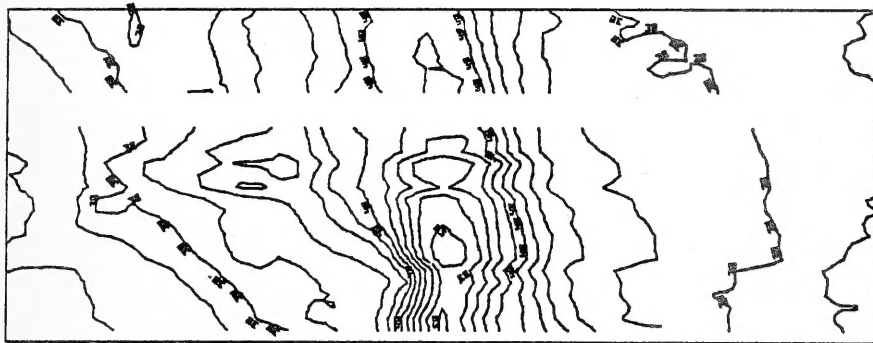
The first survey of the Western Long Island Sound disposal site was conducted on February 8 and 9, 1978, (Fig. I-3(a-h)). This survey confirmed the presence of a depression with a maximum depth of 50 meters, however, it was apparent that the major axis of the depression was east-west, while the survey was oriented north-south. Therefore, the second survey, on July 25, 1978, (Fig. I-4(a-m)), was altered such that the north-south lanes were shortened and increased in number to provide more coverage in the east-west direction. This survey provided a better description of the depression, indicating a steeper slope on the northern margin and more gentle, uniform slopes on the southern side. A significant





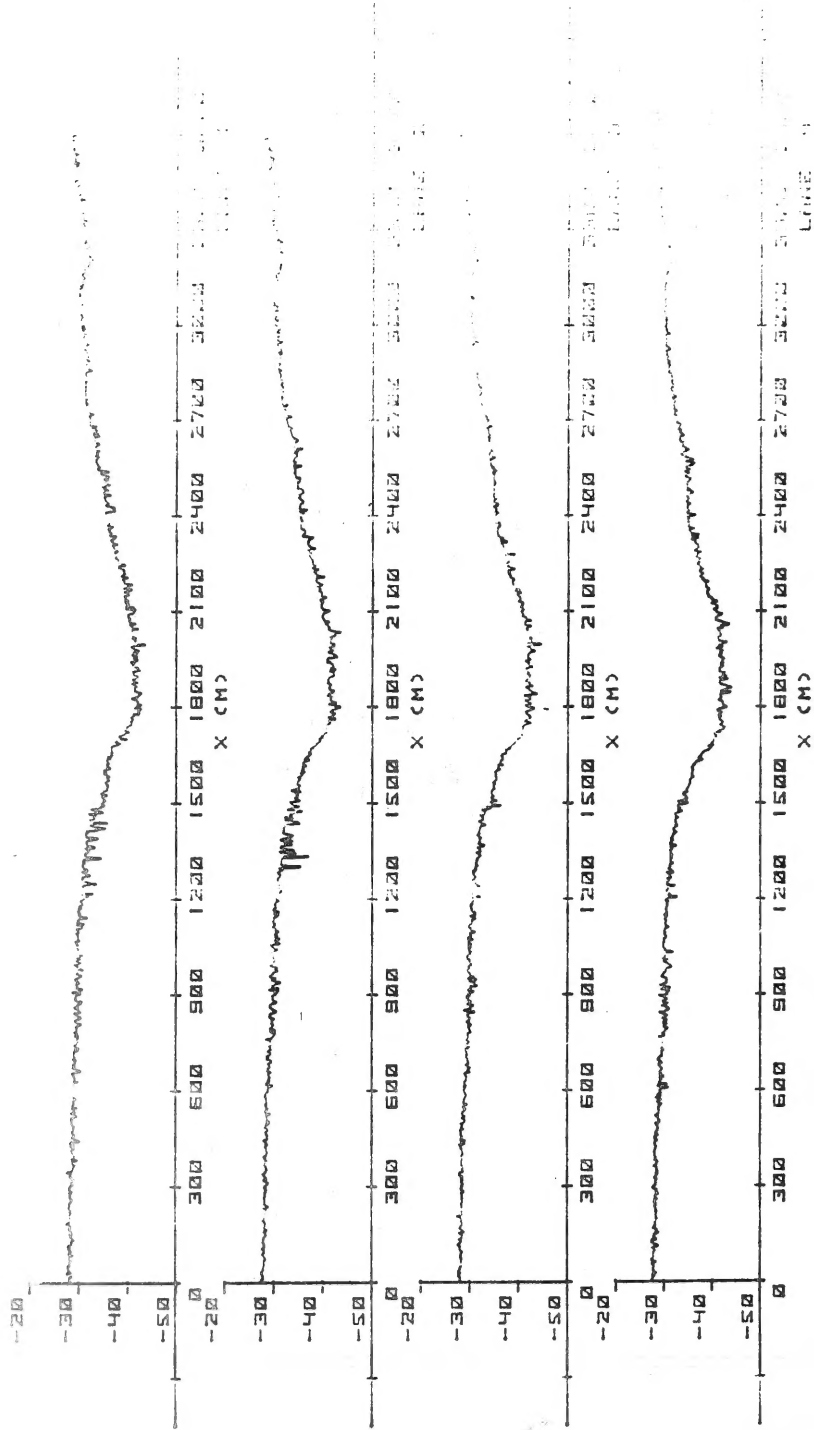


WESTERN LONG ISLAND SOUND  
PROPOSED DISPOSAL SITE  
FEBRUARY 8 & 9, 1970  
LANE INTERVAL 5.4  
GRID RESOLUTION 75X.03M  
CONTOUR INTERVAL 2.0  
DATUM: MLLW



WESTERN LONG ISLAND SOUND  
 8-9 FEBRUARY, 1970  
 VERTICAL EXAGGERATION - 15X

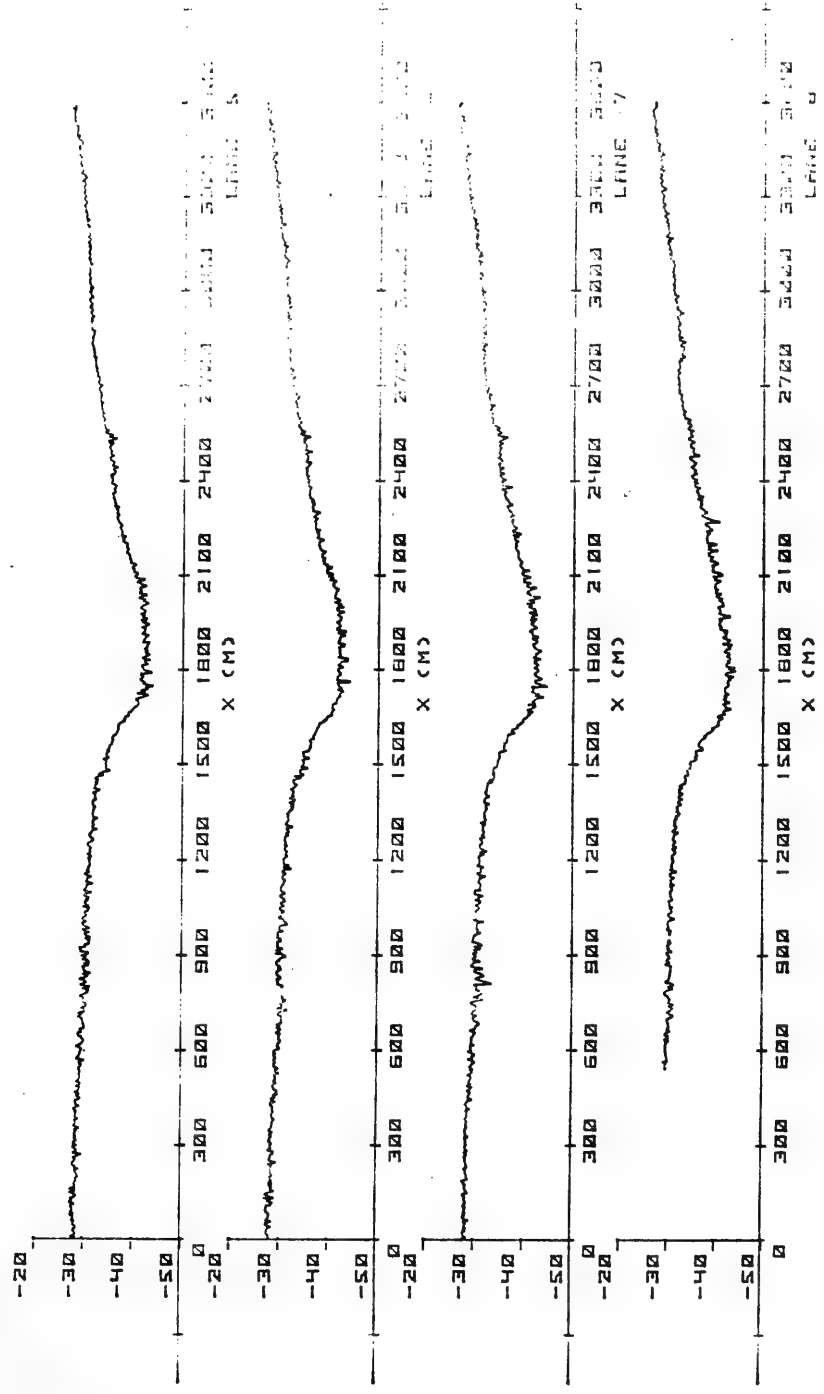
SOUTH



WESTERN LONG ISLAND SOUND  
 8-8 FEBRUARY, 1978  
 VERTICAL EXAGGERATION - 15X

SOUTH

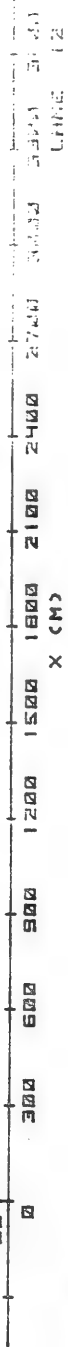
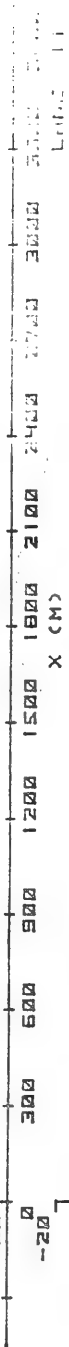
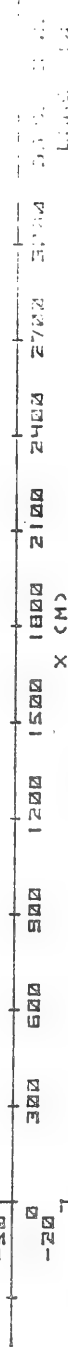
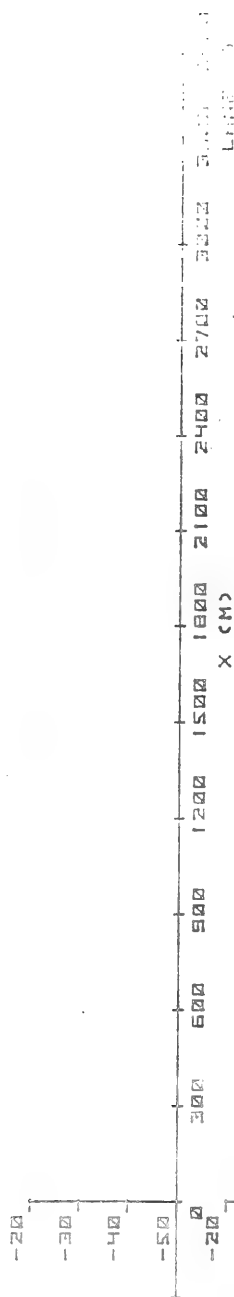
NO. 10



7 30

WESTERN LONG ISLAND SOUND  
 0-5 FEBRUARY, 1974  
 VERTICAL EXAGGERATION = 15x

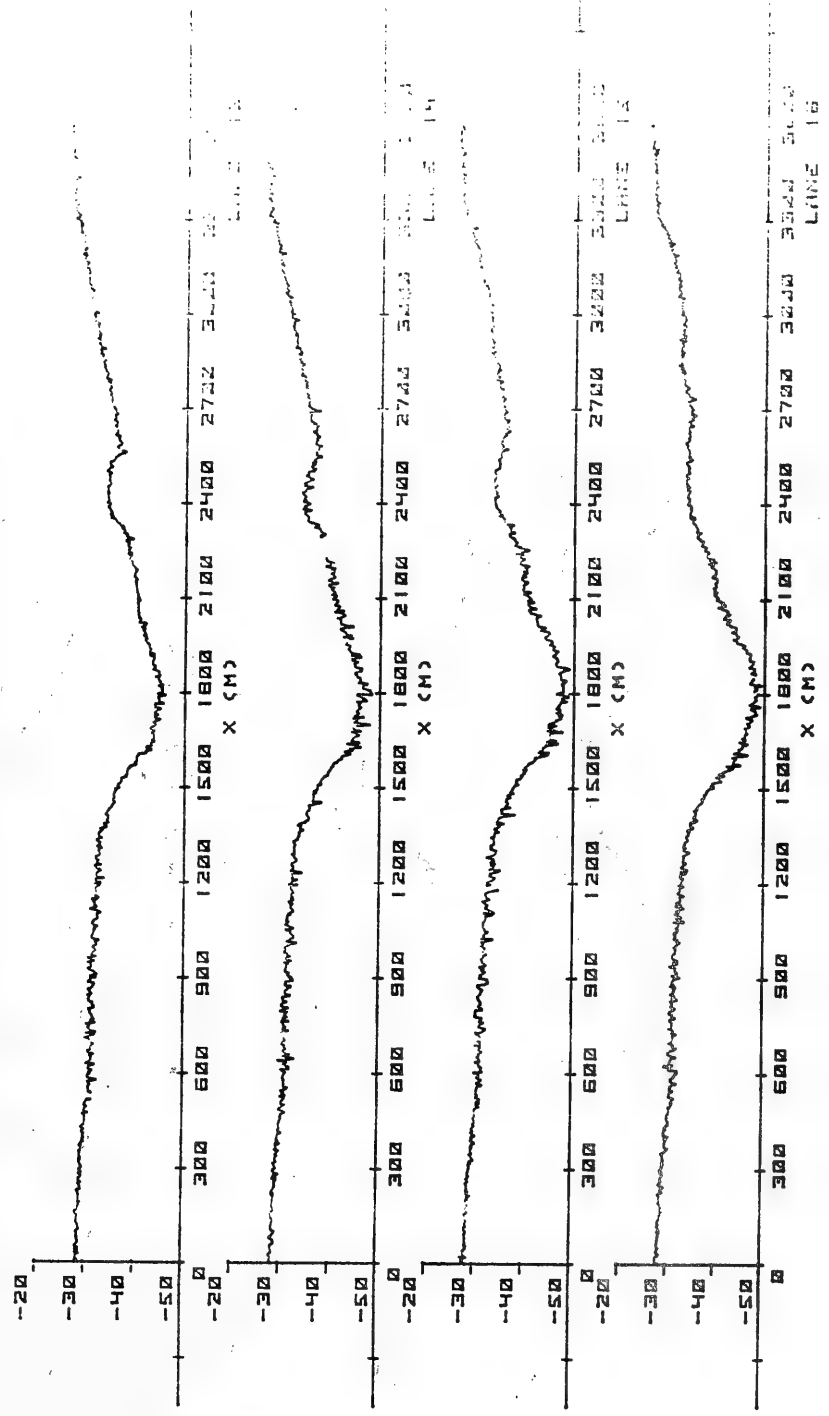
LINE 11



WESTERN LONG ISLAND SOUND  
 8-9 FEBRUARY, 1973  
 VERTICAL EXAGGERATION · 15X

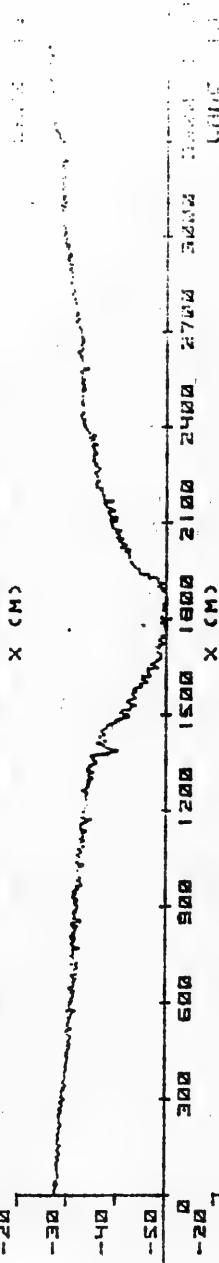
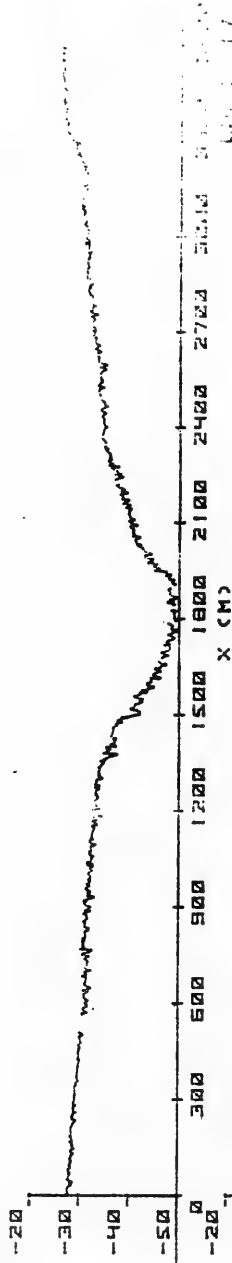
SOUTH

001010



SOUTH

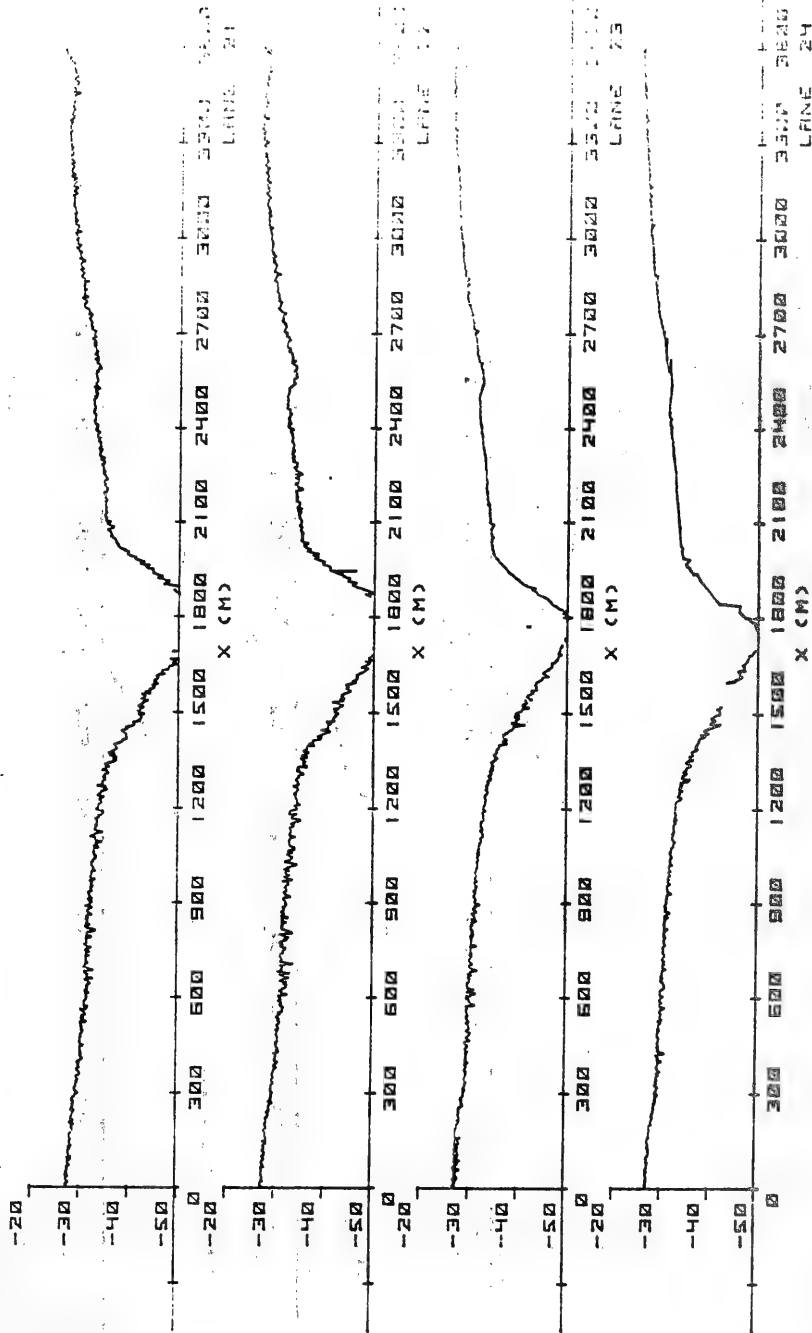
WESTERN LONG ISLAND SOUND  
6-9 FEBRUARY, 1978  
VERTICAL EXaggerATION, 15X



Ac-I

WESTERN LONG ISLAND SOUND  
8-9 FEBRUARY, 1978  
VERTICAL EXAGGERATION · 15X

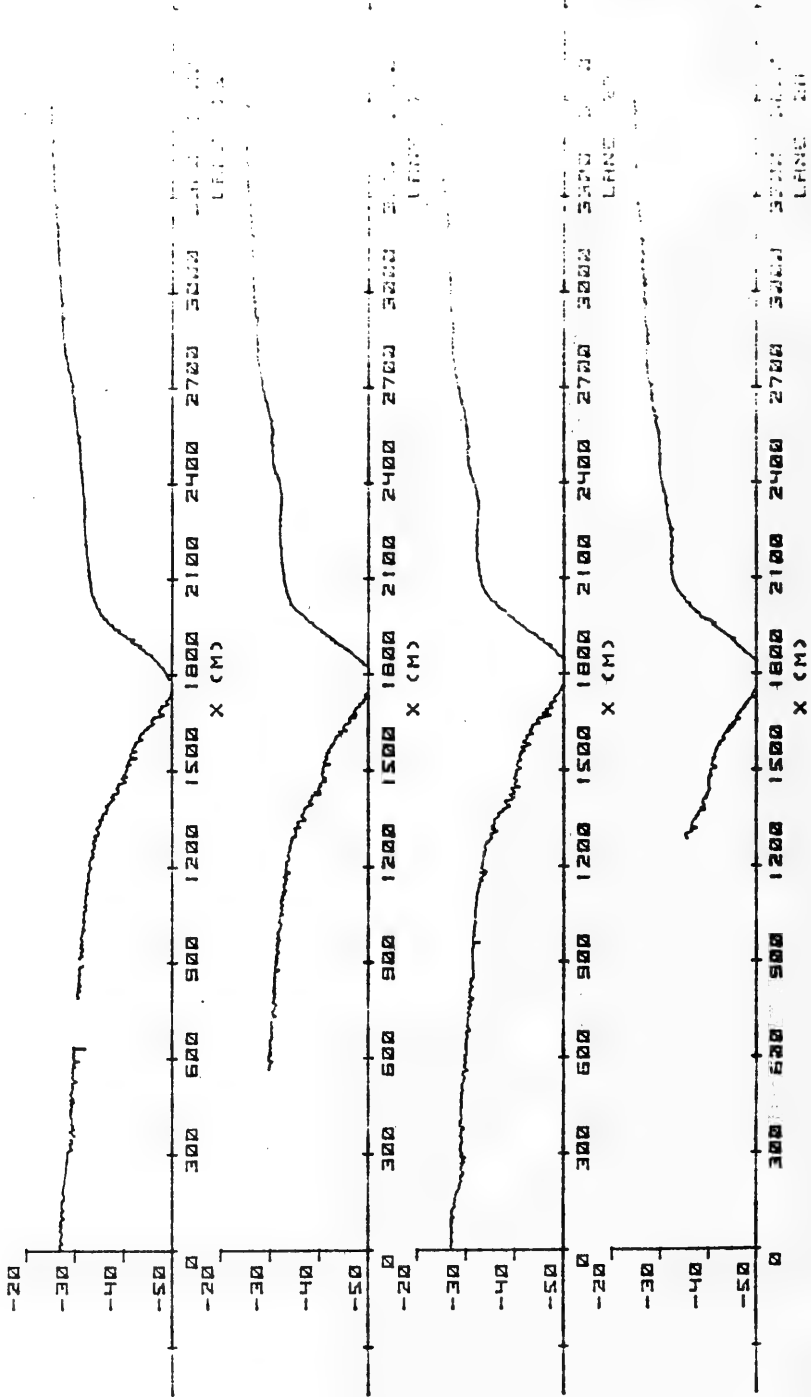
SOUTH



WESTERN LONG ISLAND SOUND  
 0-9 FEBRUARY, 1978  
 VERTICAL EXAGGERATION = 15X.

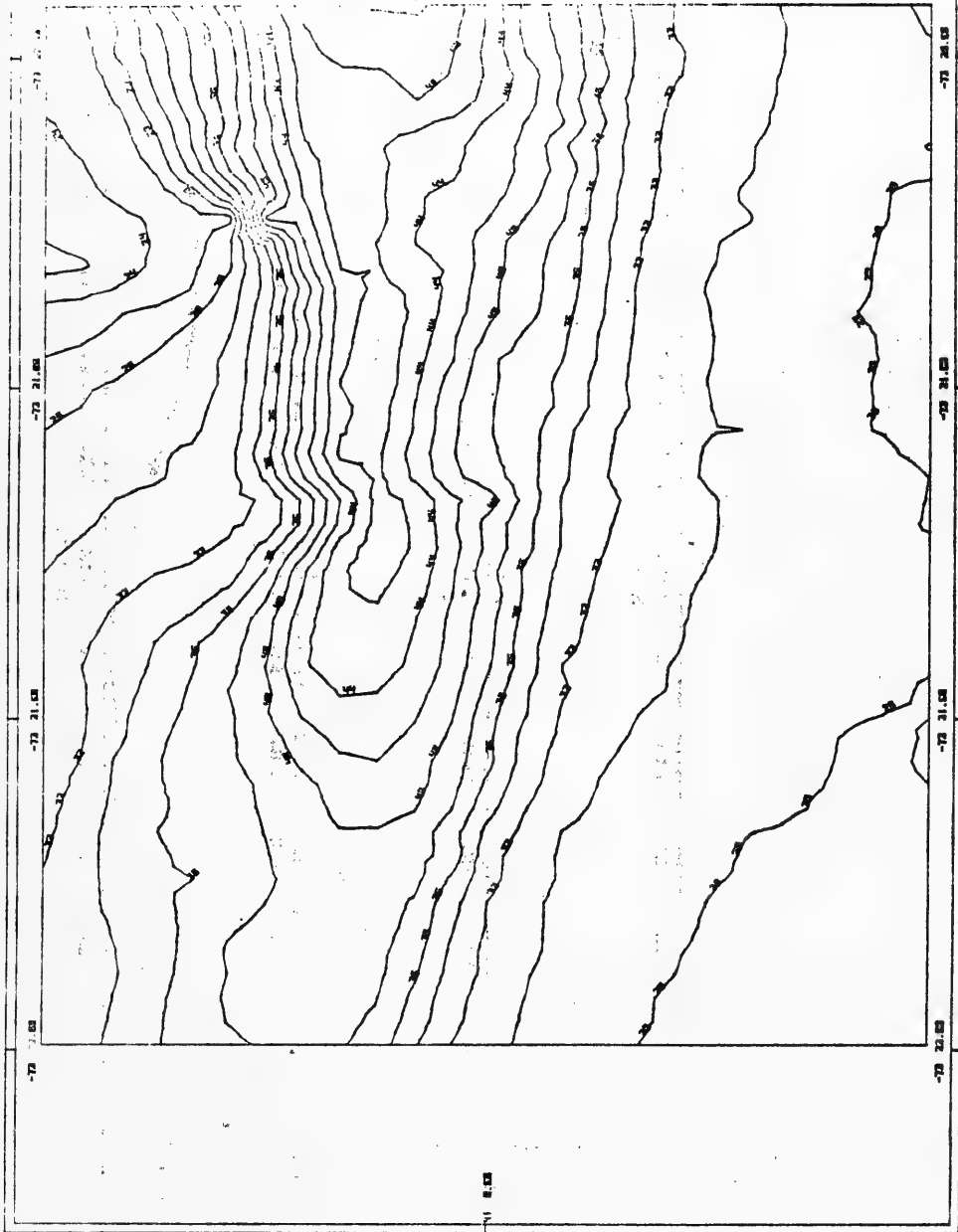
SOUTH

SOUTH





UNITED STATES  
DEPARTMENT OF THE ARMY  
ENGINEERING CENTER  
FORT BELLEVILLE, ILLINOIS  
WASHINGTON, D. C.

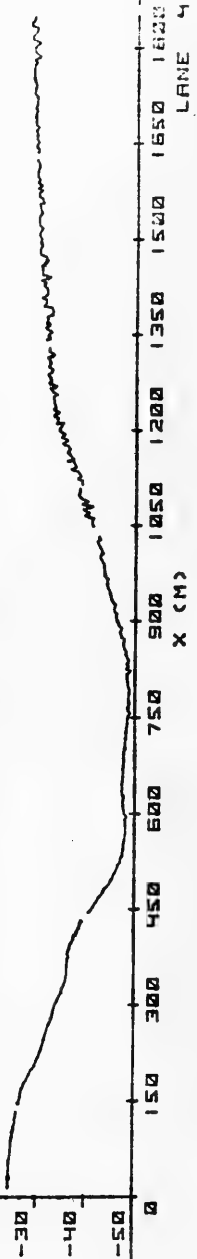
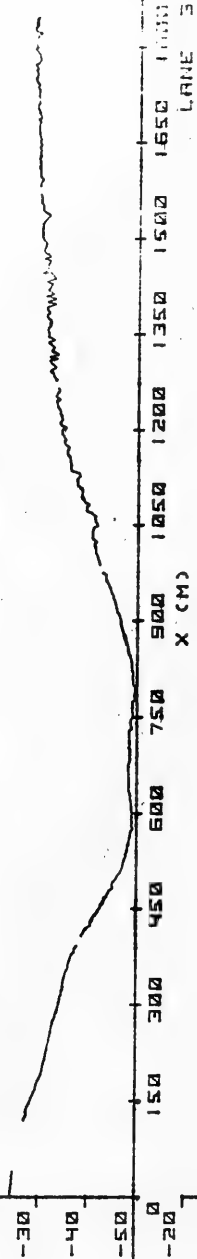
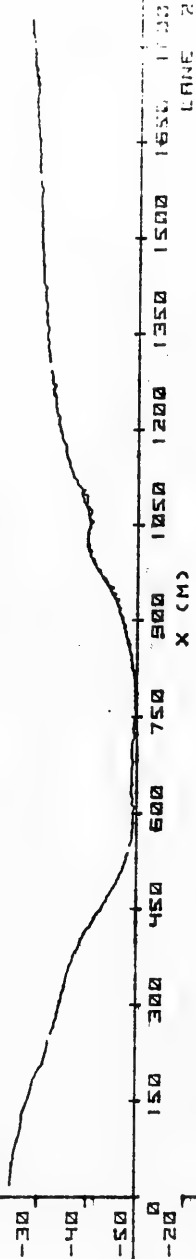
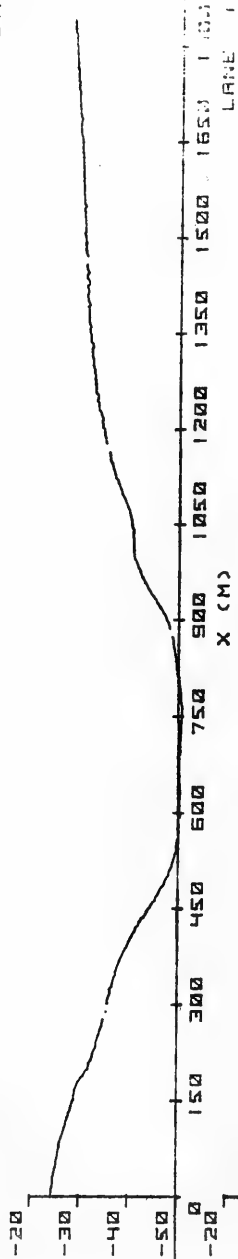


T-4a

WESTERN LONG ISLAND SOUND  
 JULY 25 & 26, 1978  
 LANE INTERVAL - 50M  
 VERTICAL EXAGGERATION - 7.5X

SOUTH

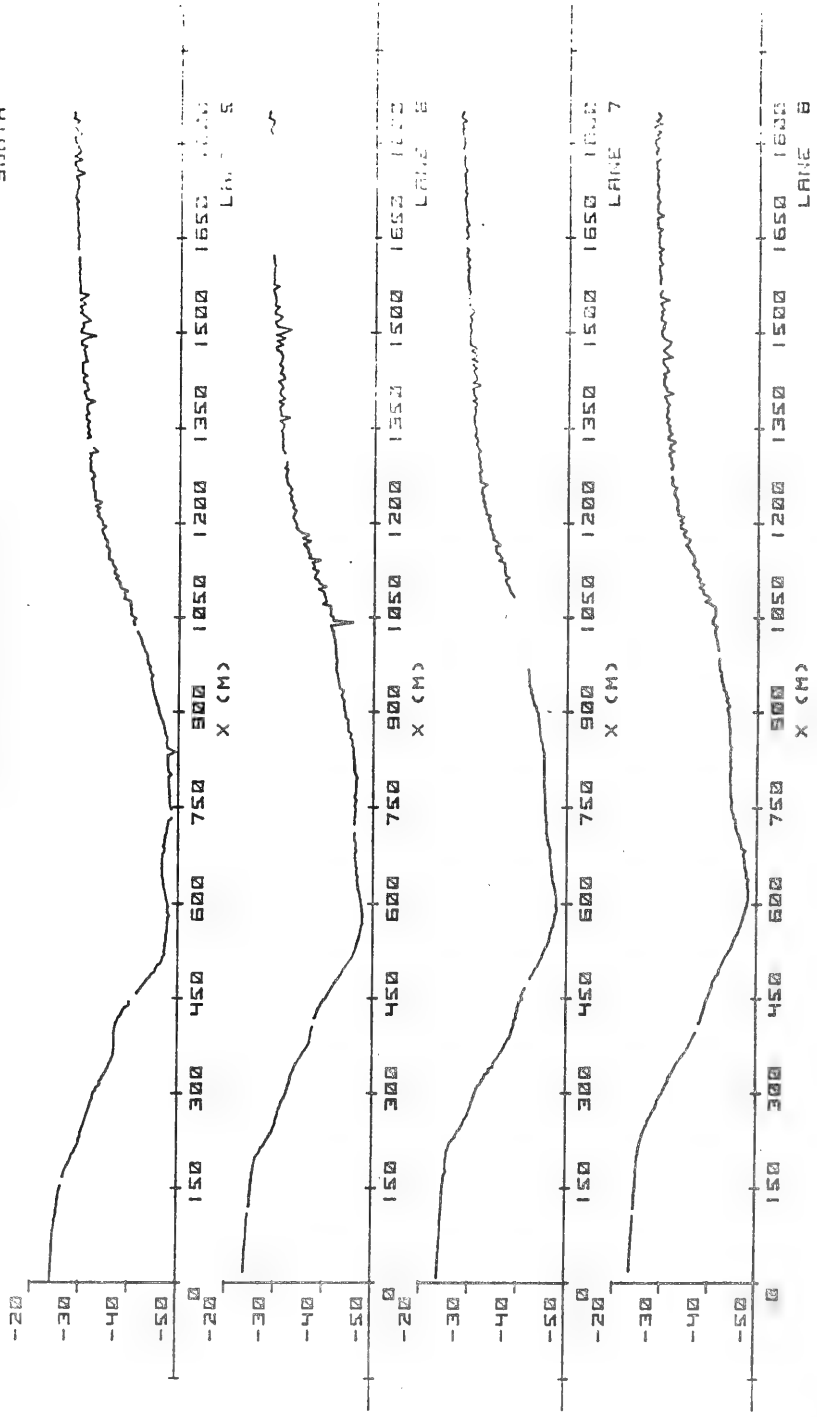
NORTH



WESTERN LONG ISLAND SOUND  
 JULY 25 & 26, 1978  
 LANE INTERVAL - 50M  
 VERTICAL EXAGGERATION - 7.5X

NORTH

SOUTH

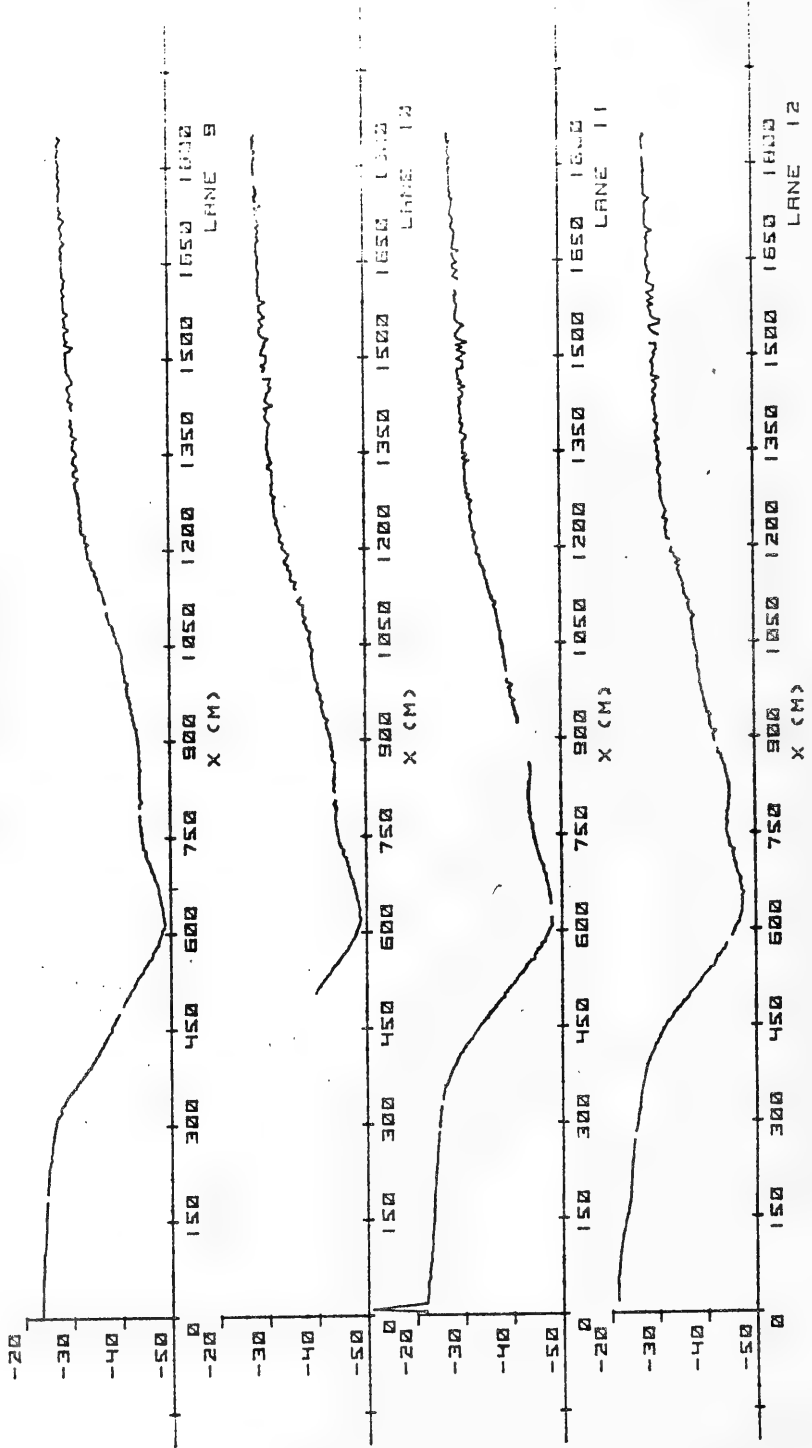


24c

WESTERN LONG ISLAND SOUND  
 JULY 26, 1970  
 1570M  
 1570M  
 INTERVAL - 5.0M  
 VERTICAL EXAGGERATION - 7.5X

SOUTH

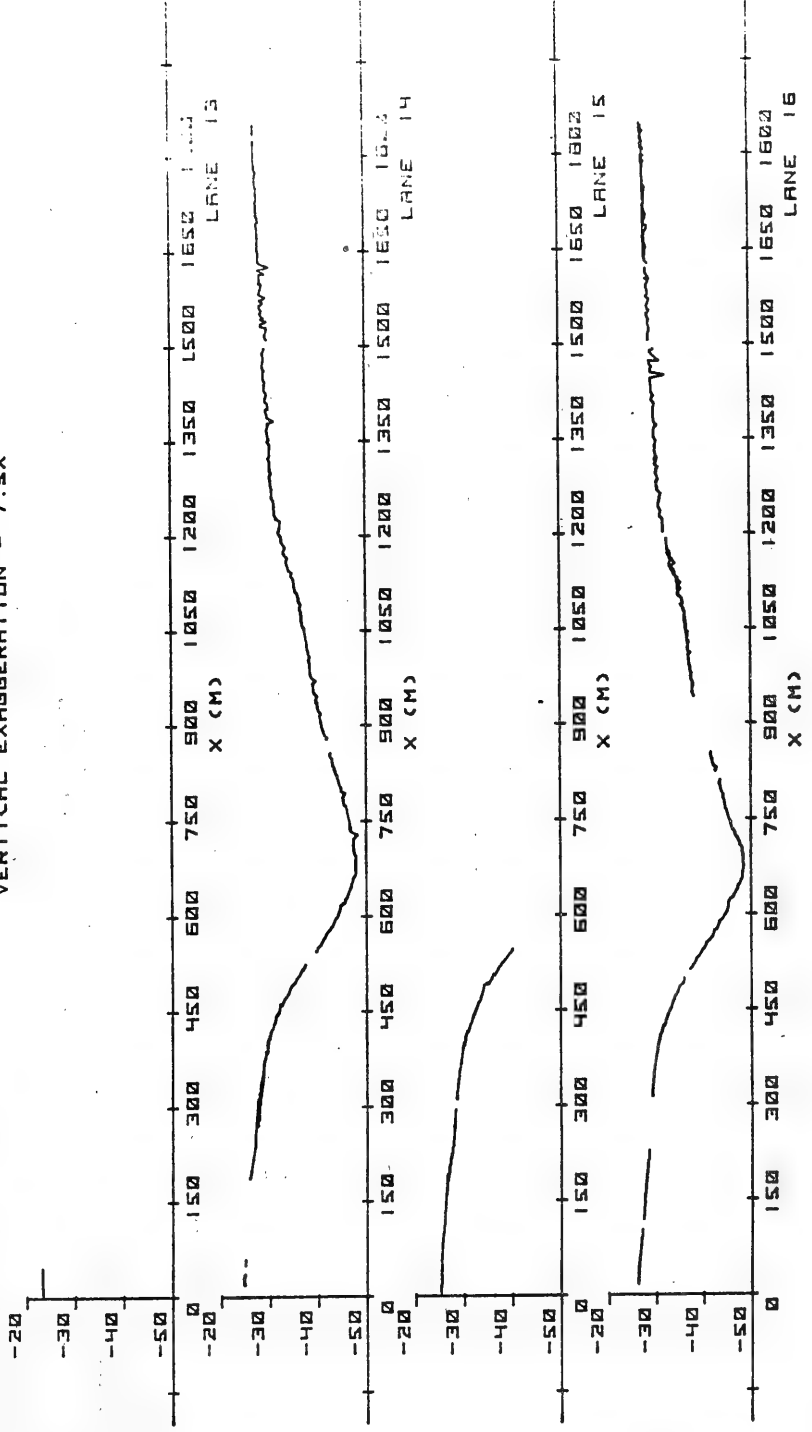
NORTH



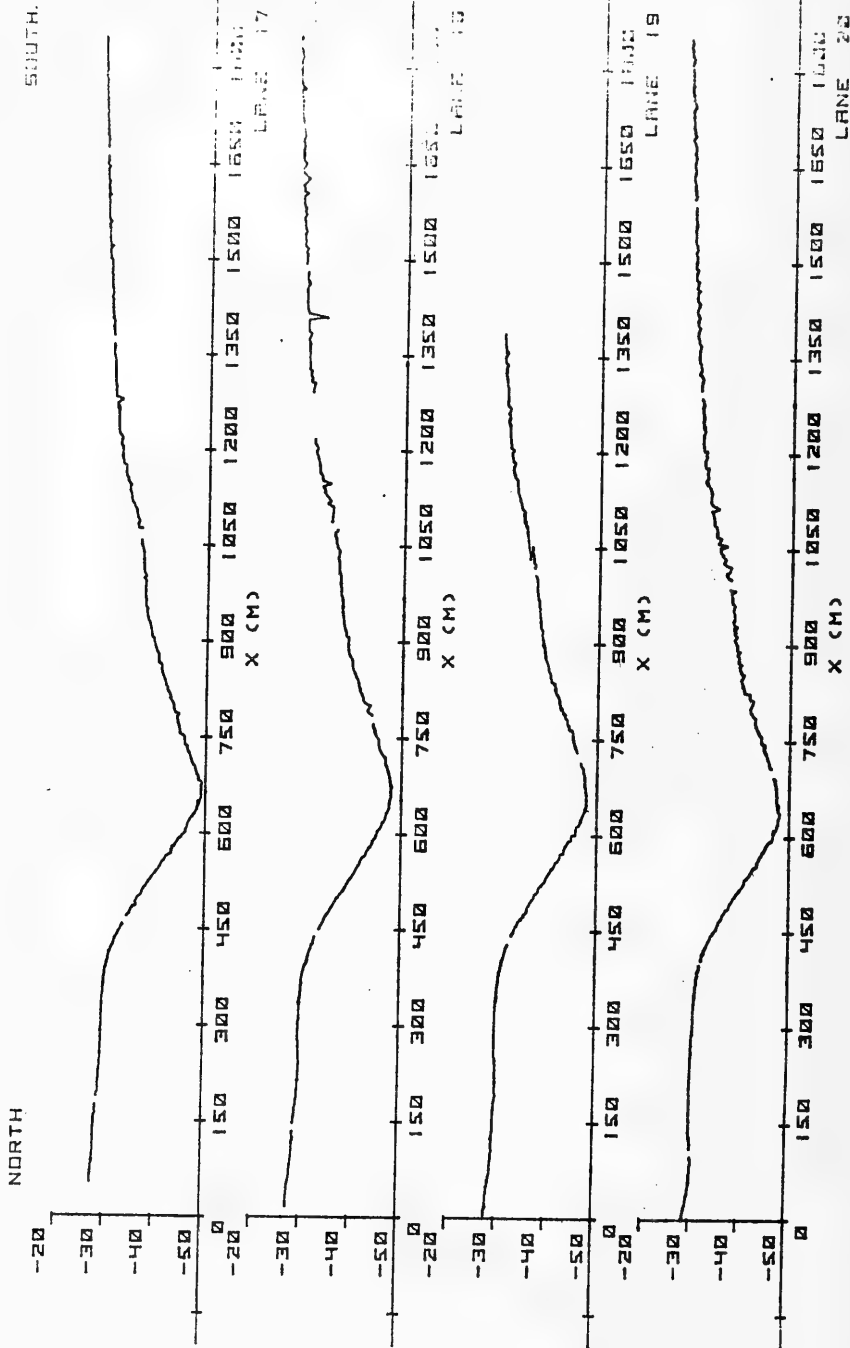
WESTERN LONG ISLAND SOUND  
 JULY 25 & 26, 1978  
 LANE INTERVAL - 50M  
 VERTICAL EXAGGERATION - 7.5X

SOUTH

NORTH



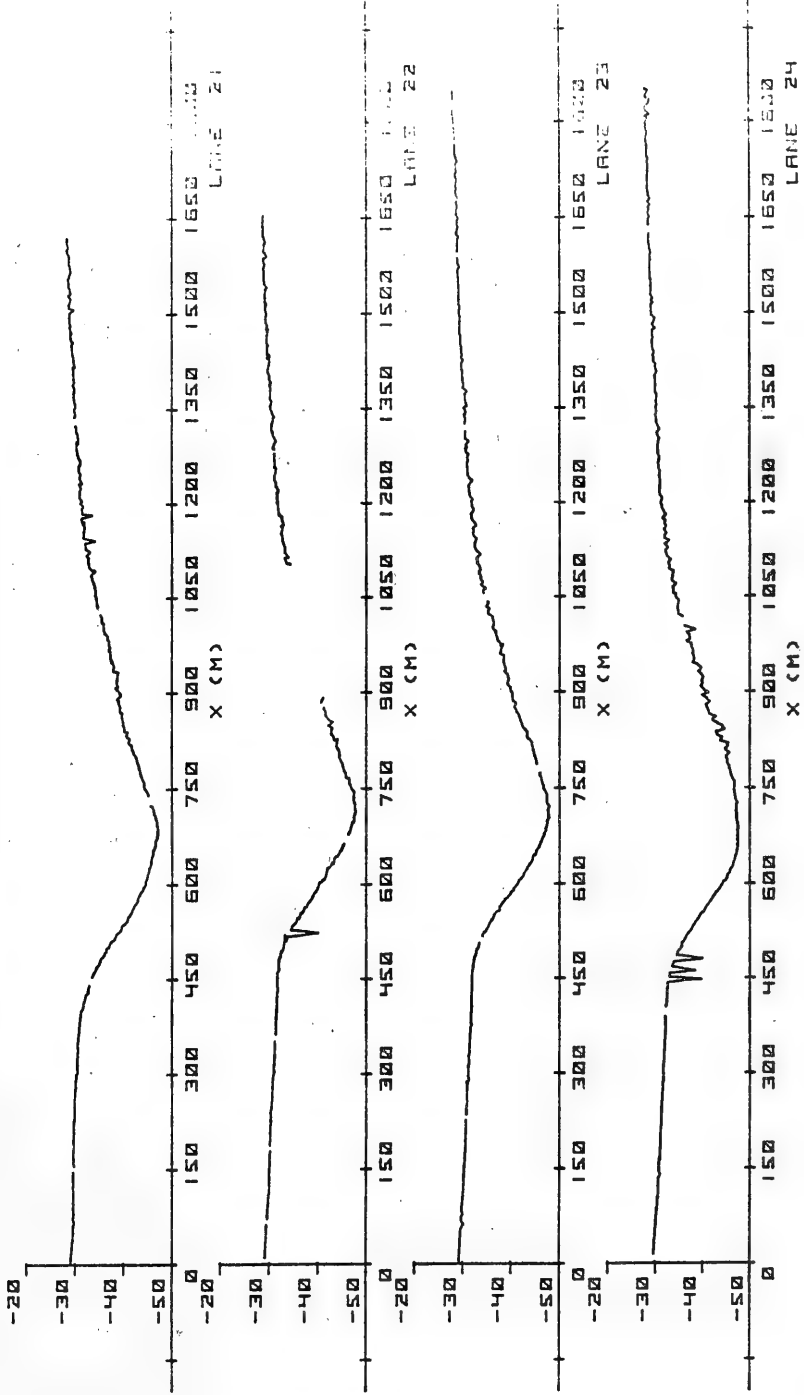
WESTERN LONG ISLAND SOUND  
 JULY 25 & 26, 1978  
 LANE INTERVAL - 50M  
 VERTICAL EXAGGERATION - 7.5X



WESTERN LONG ISLAND SOUND  
 JULY 25 & 26, 1978  
 LANE INTERVAL - 50M  
 VERTICAL EXAGGERATION - 7.5X

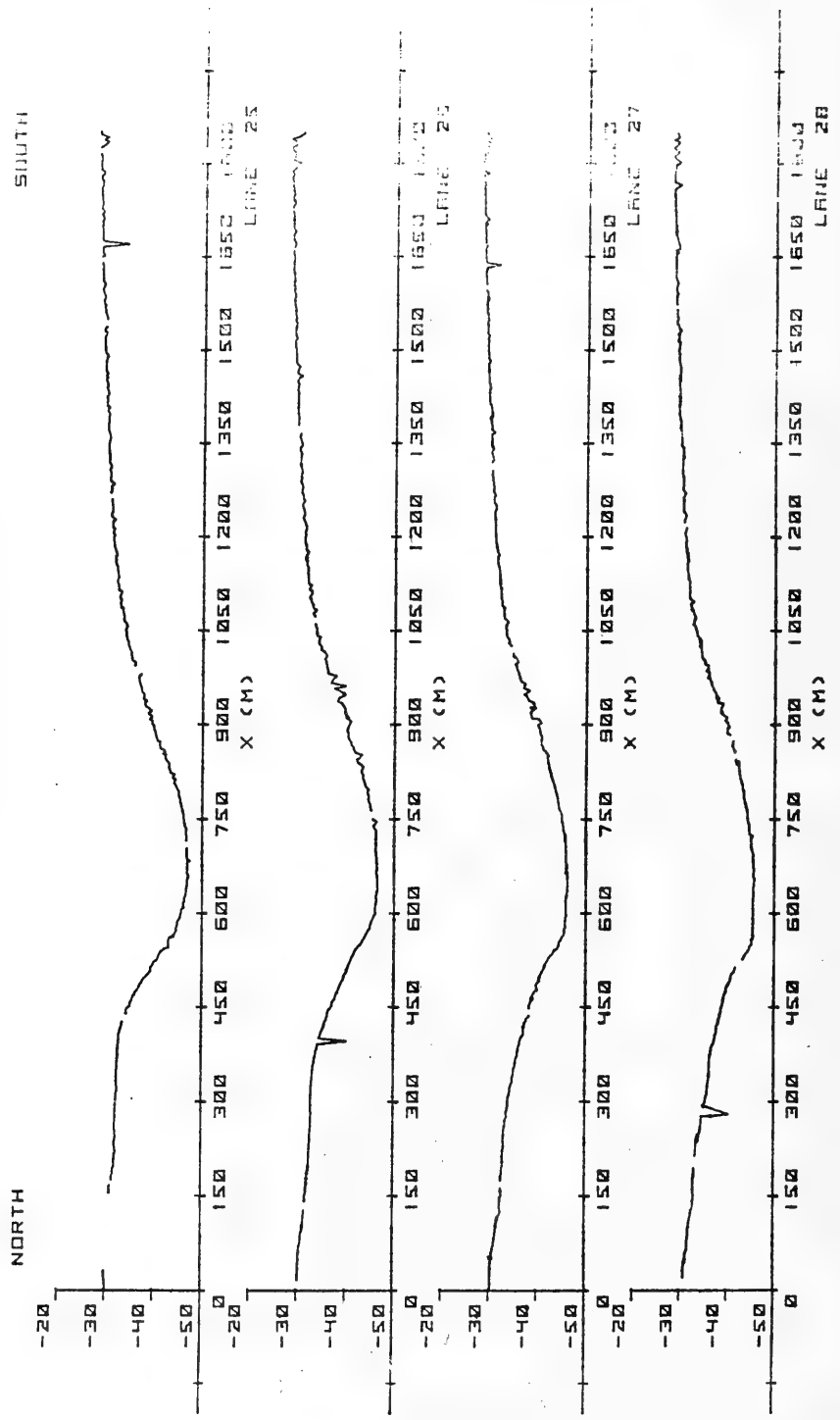
NORTH

SOUTH



I-49

WESTERN LONG ISLAND SOUND  
 JULY 25 & 26, 1978  
 LANE INTERVAL - 50M  
 VERTICAL EXAGGERATION - 7.5X



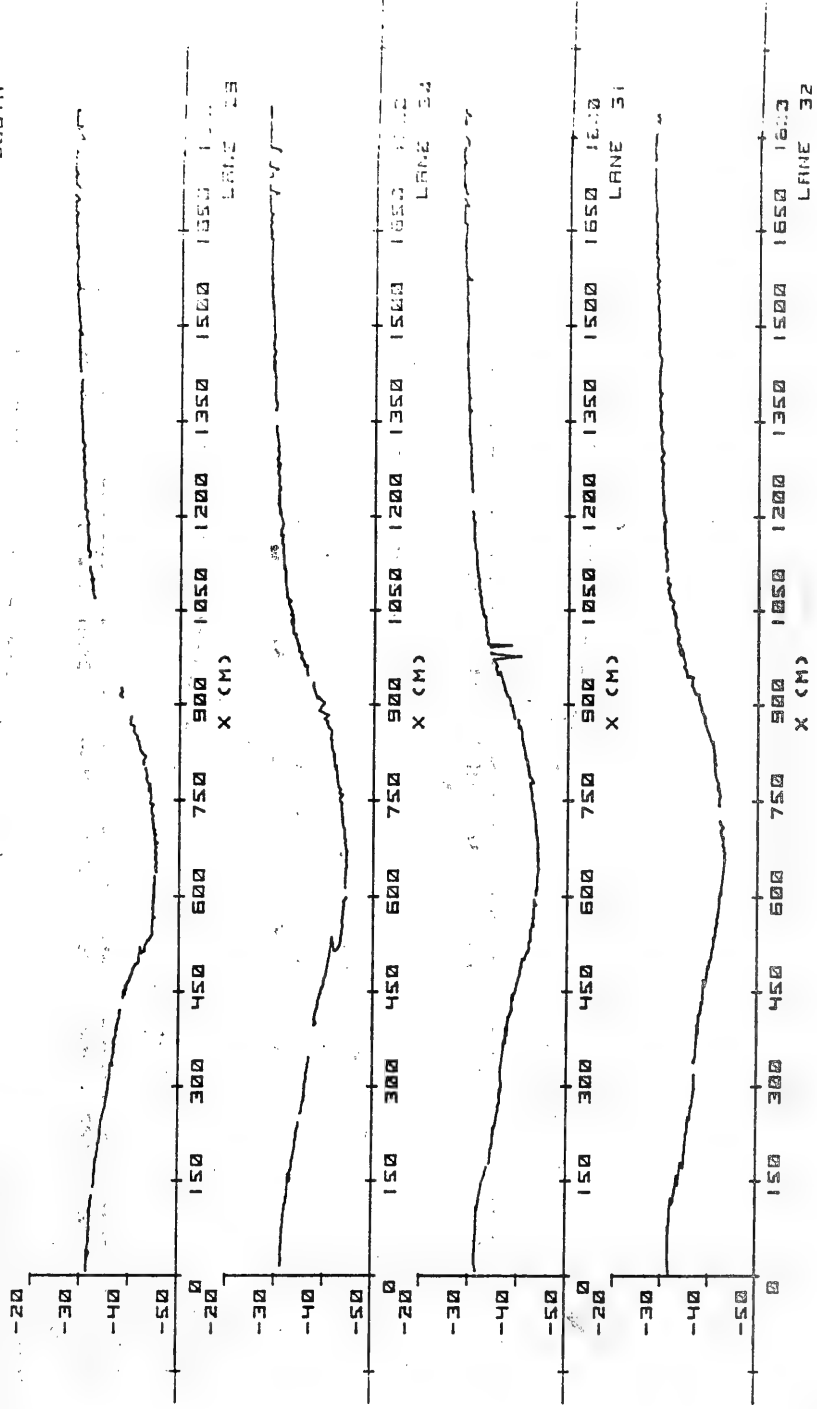
T-4A



WESTERN LONG ISLAND SOUND  
 JULY 26 & 28, 1970  
 LANE INTERVAL - 30M  
 VERTICAL EXAGGERATION - 7.5X

NORTH

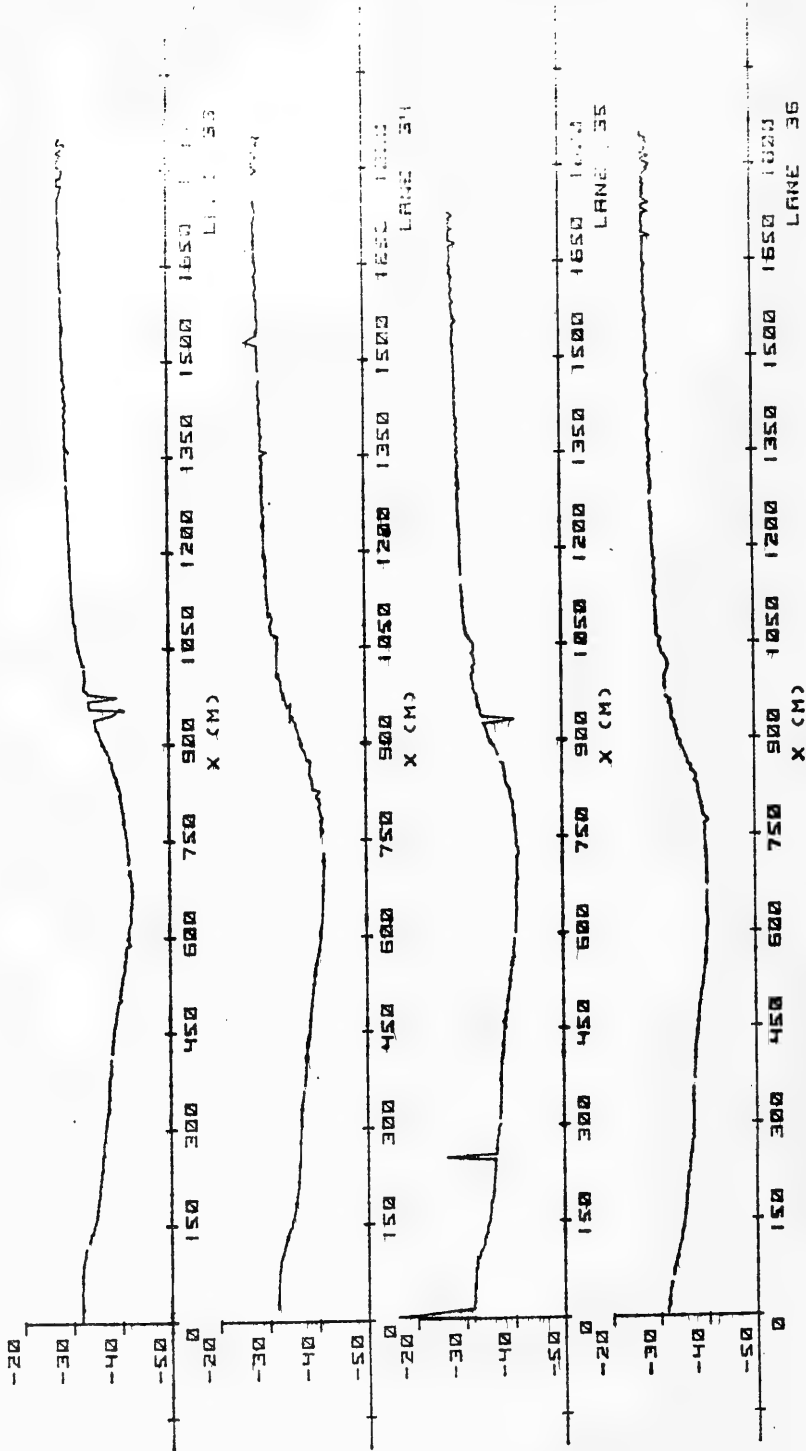
SOUTH



WESTERN LONG ISLAND SOUND  
 JULY 25 & 26, 1978  
 LANE INTERVAL - 50M  
 VERTICAL EXAGGERATION - 7.5X

NORTH

SOUTH

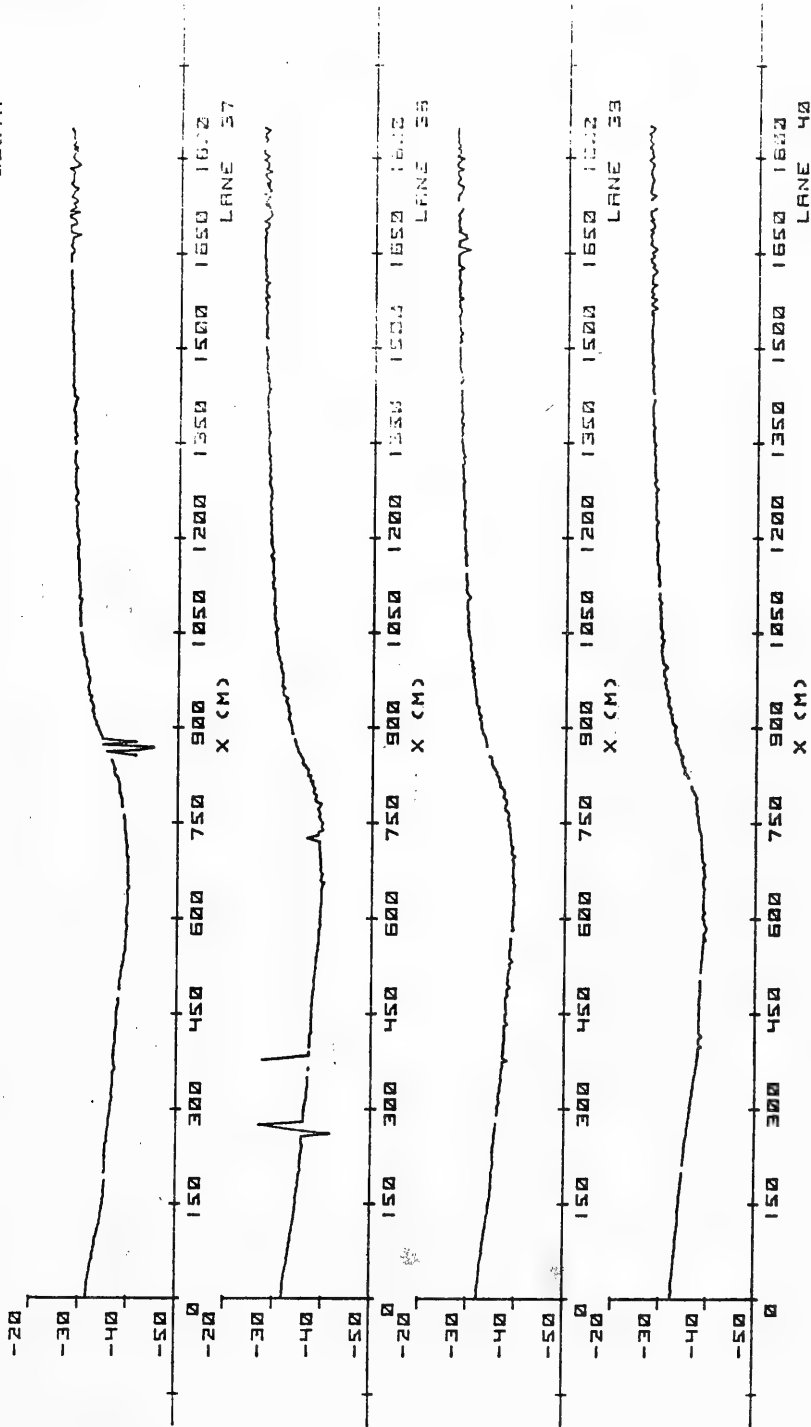


I-43

WESTERN LONG ISLAND SOUND  
 JULY 25 & 26, 1978  
 LANE INTERVAL - 50M  
 VERTICAL EXAGGERATION - 7.5X

NORTH

SOUTH

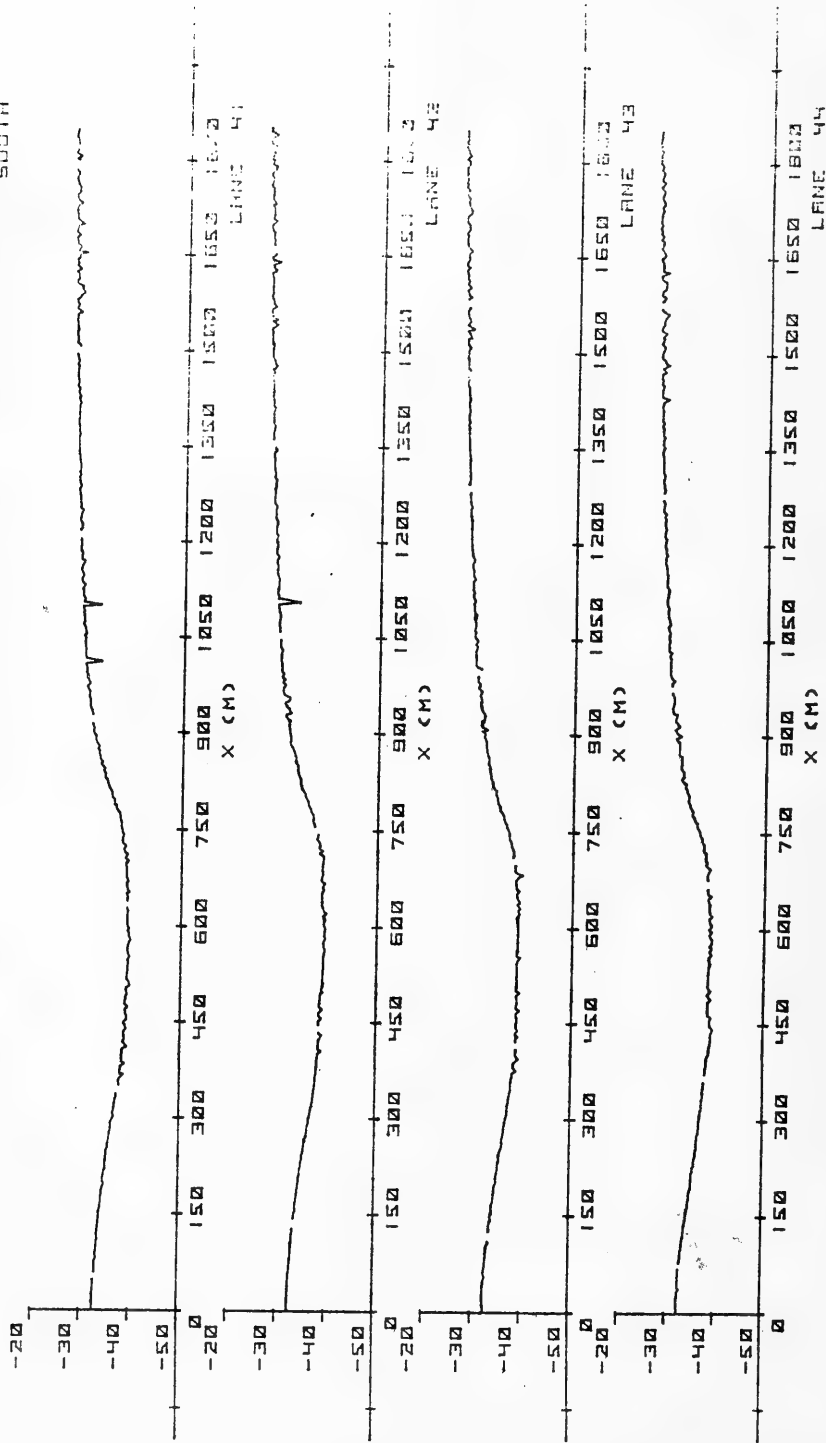


I-41A

WESTERN LONG ISLAND SOUND  
 JULY 25 & 26, 1978  
 LANE INTERVAL - 50M  
 VERTICAL EXAGGERATION - 7.5X

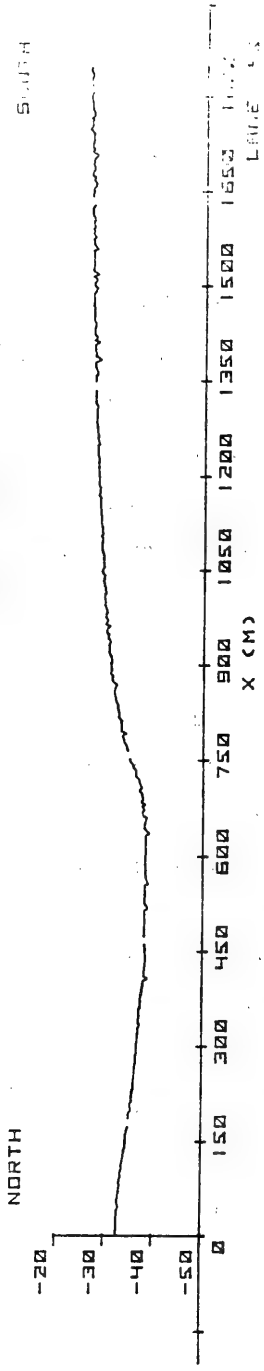
NORTH.

SOUTH



I-41

WESTERN LONG ISLAND SOUND  
JULY 25 & 26, 1978  
LANE INTERVAL - 50M  
VERTICAL EXAGGERATION - 7.5X



I-4/m

4

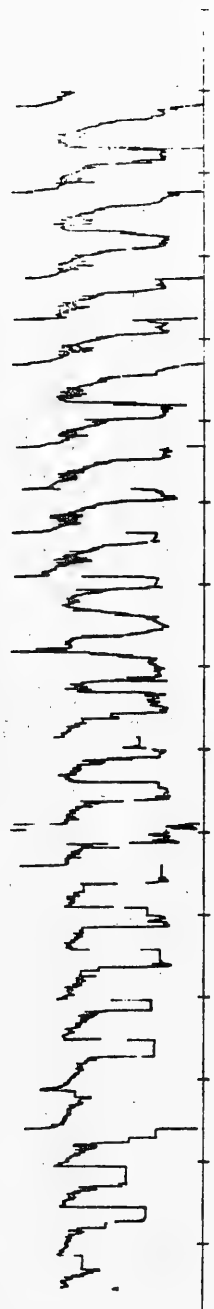
observation made during this survey, that eventually caused the rejection of this site as a potential disposal area, was the presence of many lobster trawls along the northern slope of the depression.

Bathymetric surveys were conducted at the Cable and Anchor Reef site on February 9, 1978 (Fig. I-5(a- )), and on July 26, 1978 (Fig. I-6(a- )). The predominant features on these surveys were the steep slope toward Cable and Anchor Reef on the eastern edge of the area, a NE-SW trending mound on the north-east section of the site and a circular mound in the western section. All features are repeated on both surveys, however, the size of this site compares with that of Boston Foul Ground and Lightship and detailed comparisons of contours are prohibited because of the scale factors involved.

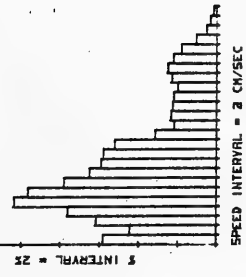
#### Currents

Two sets of current meter data have been obtained at the proposed Western Long Island Sound disposal site, the first from April 12 to July 1, 1978 (Fig. I-7(a-d), Table I-1), and the second from July 26 to September 7, 1978 (Fig. I-8(a-c), Table I-2). A similar record was also obtained at the Cable and Anchor Reef site from April 11 to May 20, 1978 (Fig. I-9(a-c), Table I-3), although there are recording problems for the first twelve days of the record. The two records from Western Long Island Sound cover the same period of time that data were obtained at New Haven and exhibit similar characteristics in that greater energy is present in the second record and the effects of a storm surge can be seen in the data. In this case, however, the major increase in kinetic energy is not restricted to the residual component but includes tidal energy as well. Significantly, the ratio of tidal energy to total energy is constant for both series of data.

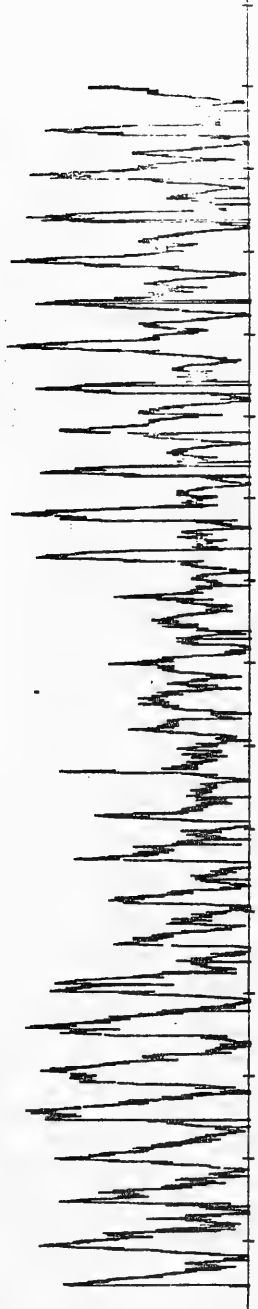
DIR (DEG)  
00  
50  
100  
180  
270  
360



WESTERN LONG ISLAND SOUND  
12 APRIL, 78 TO 27 APRIL, 78

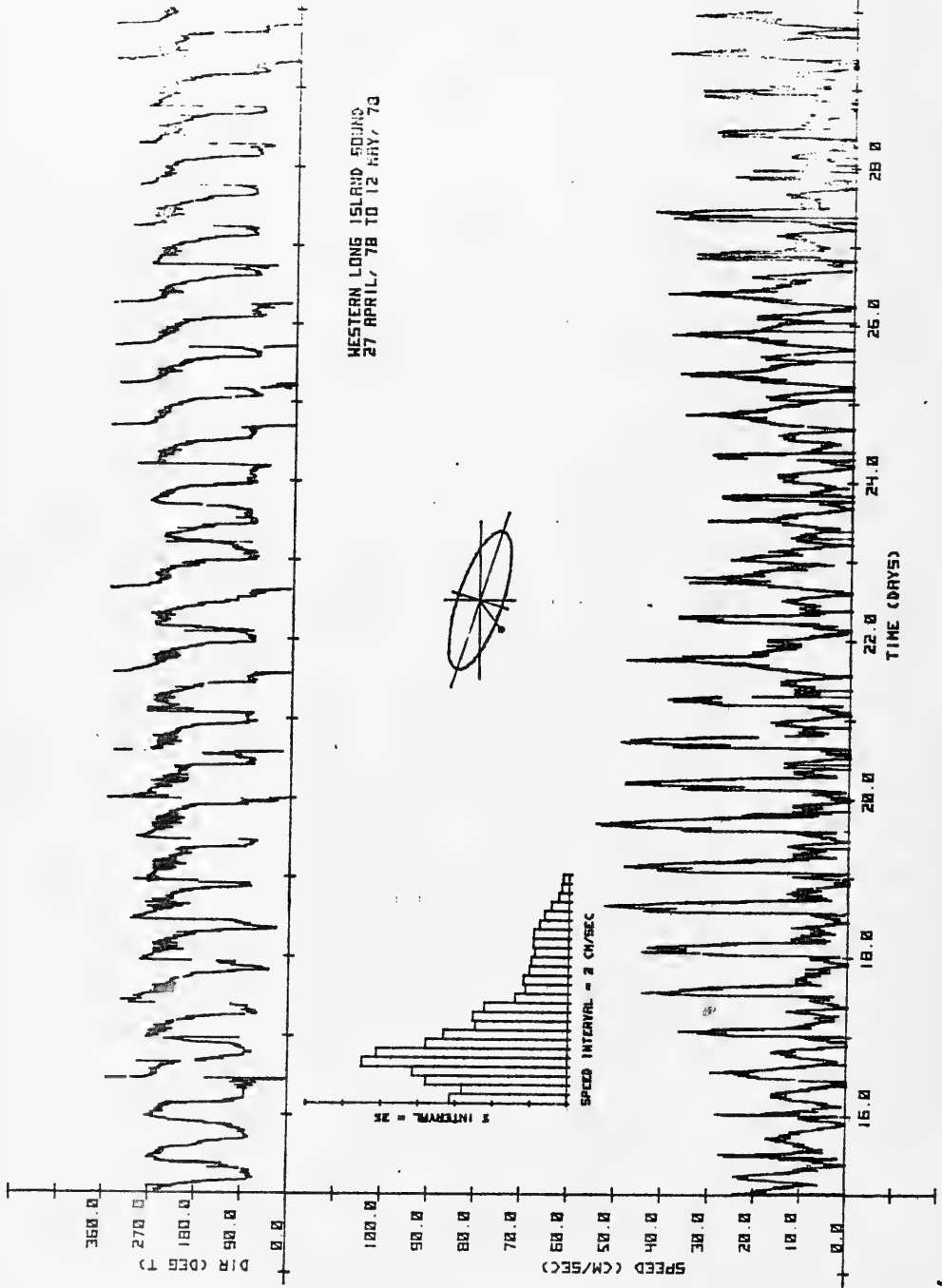


SPEED (CM/SEC)  
00  
10  
20  
30  
40  
50  
60  
70  
80  
90  
100



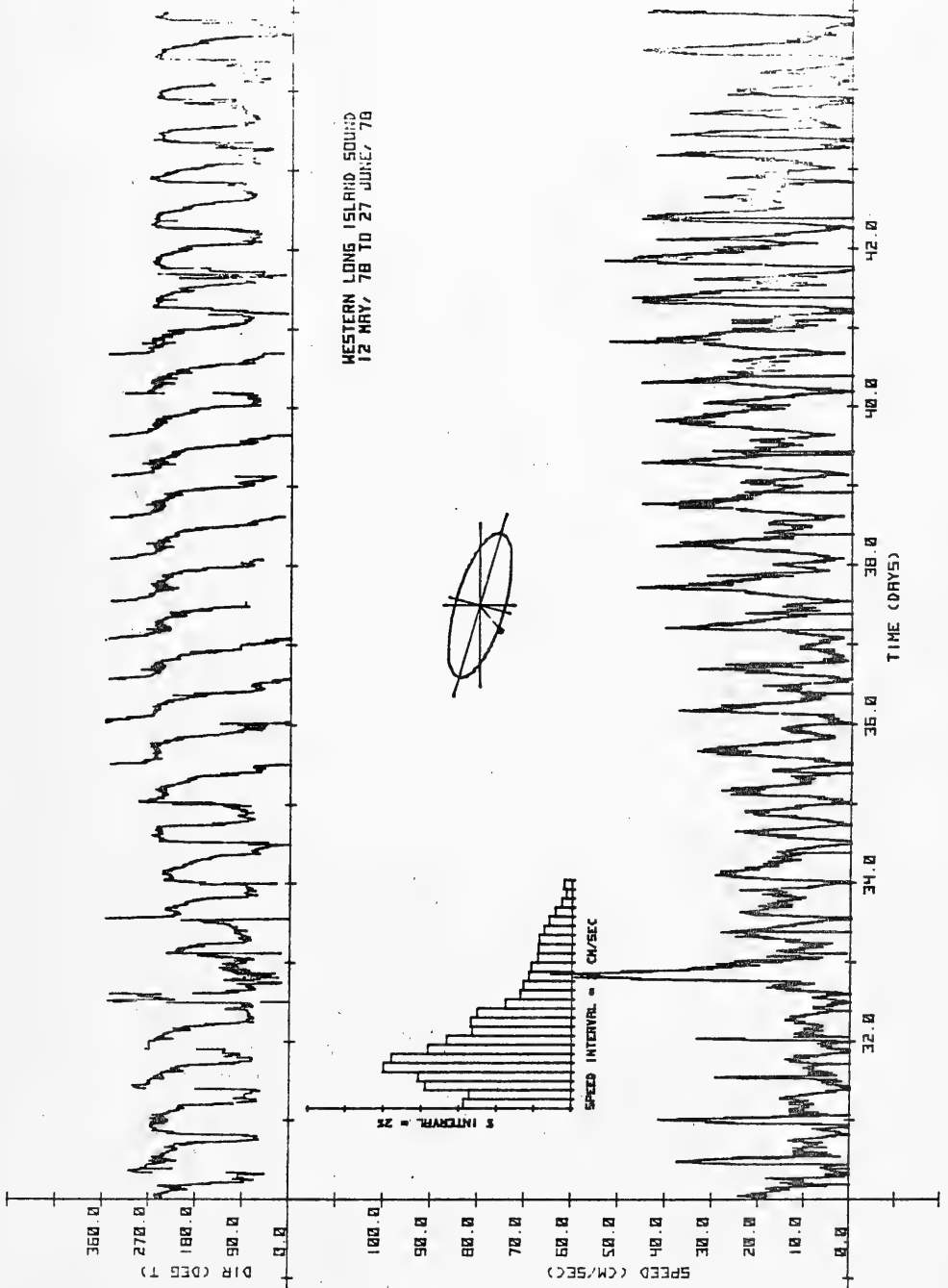
TIME (DAYS)  
0.0  
2.0  
4.0  
6.0  
8.0  
10.0  
12.0

WESTERN LONG ISLAND SOUND  
27 APRIL, 78 TO 12 MAY, 78



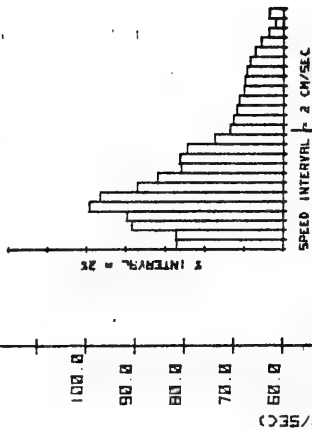
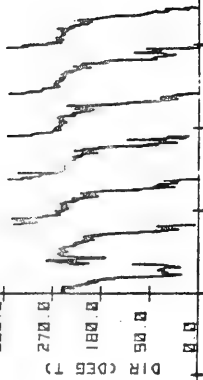
I-17 No





I-7c

WESTERN LONG ISLAND SOUND  
27 JUNE, 78 TO 1 JULY, 78

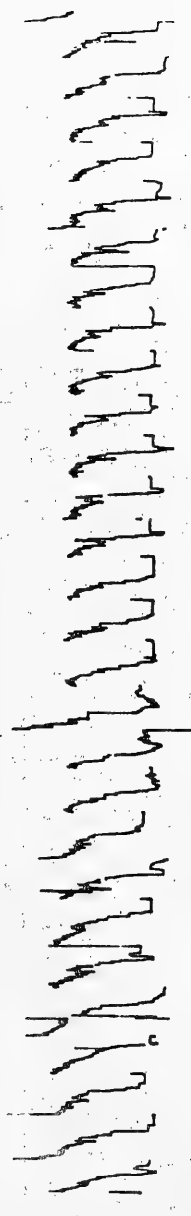


50.0  
52.0  
54.0  
56.0  
58.0

TIME (DRYS)

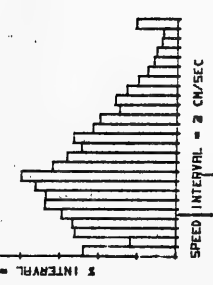
I-7d

760.0  
270.0  
180.0  
90.0  
0.0  
DIR (DEG)

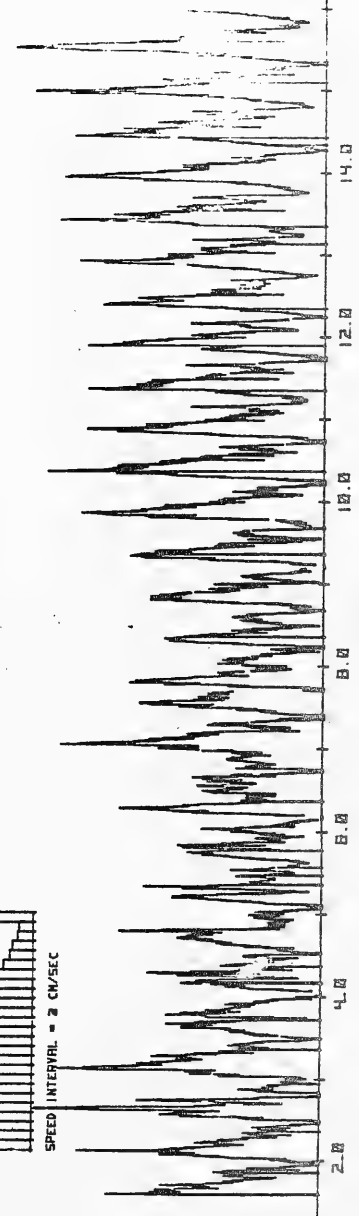


WESTERN LONG ISLAND SOUND  
26 JULY, 78 TO 10 AUG, 78

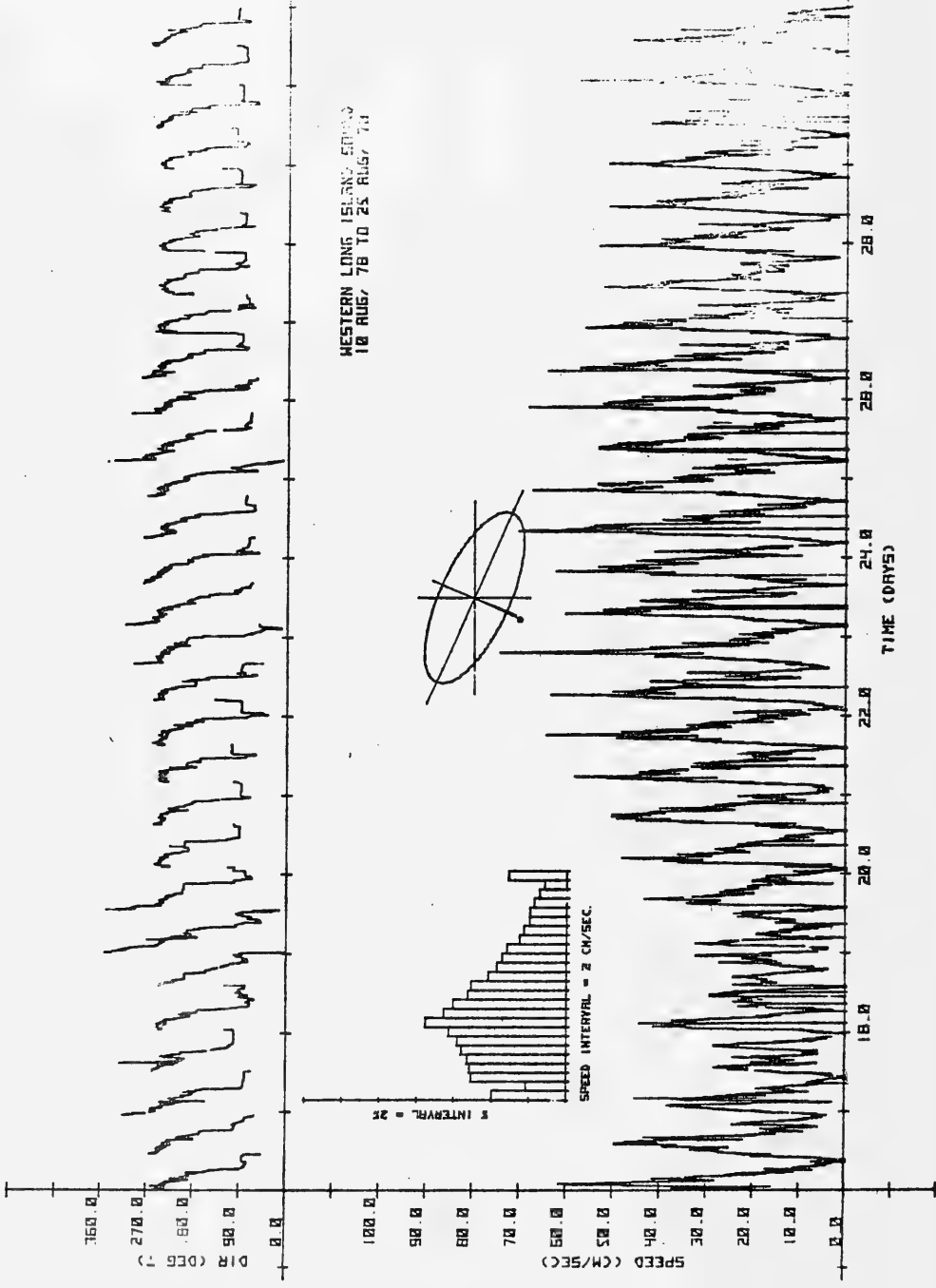
100.0  
90.0  
80.0  
70.0  
60.0  
50.0  
40.0  
30.0  
20.0  
10.0  
0.0  
SPEED (CM/SEC)



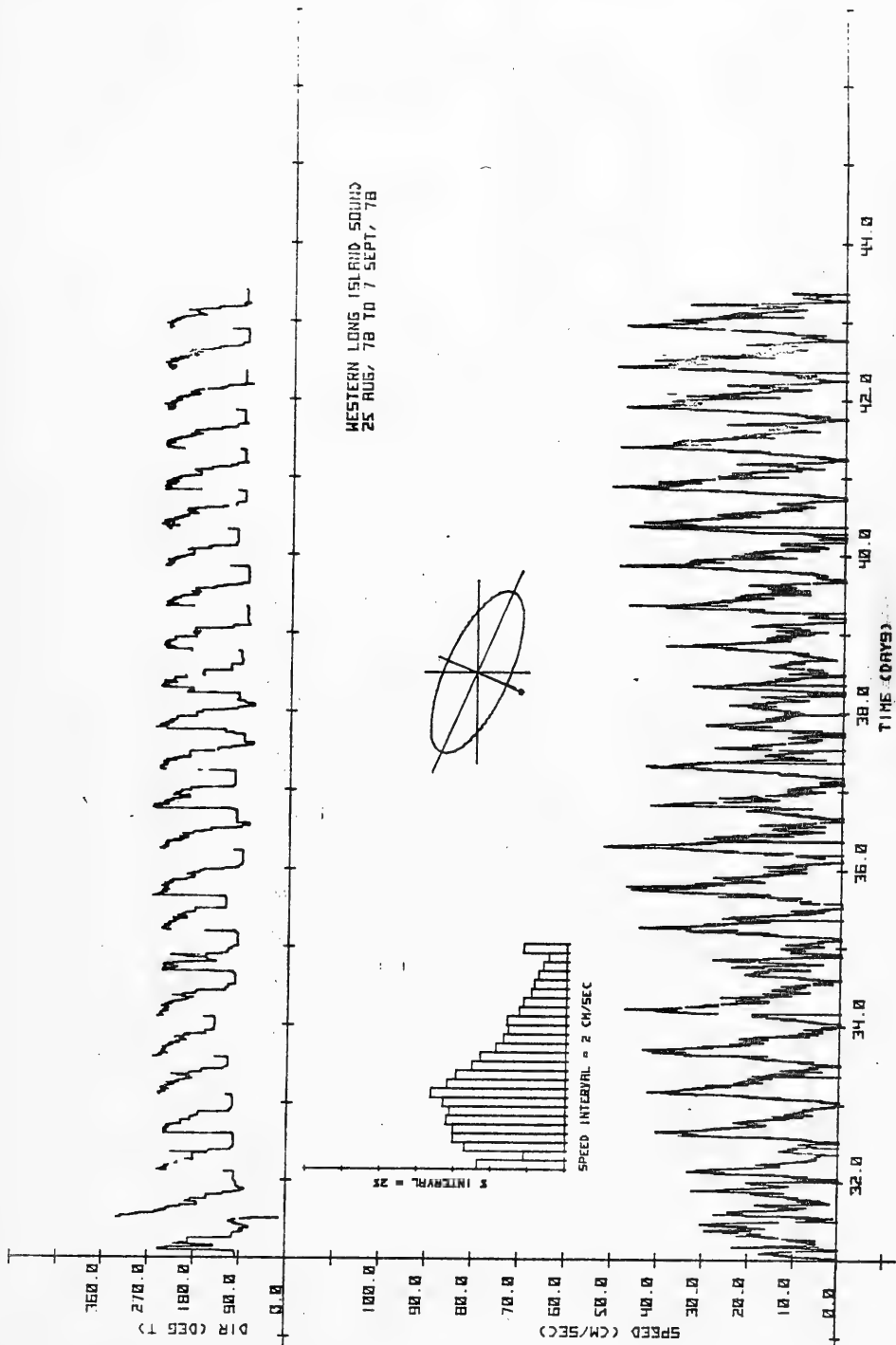
100.0  
90.0  
80.0  
70.0  
60.0  
50.0  
40.0  
30.0  
20.0  
10.0  
0.0  
TIME (DAYS)



WESTERN LONG ISLAND SOUND  
 18 AUG, 78 TO 25 AUG, 78



I-8B



T-8-c

CABLE AND ANCHOR REEF  
FEBRUARY 9, 1978  
LANE INTERVAL: 50M  
GRID RESOLUTION: 100X50M  
CONTOUR INTERVAL: 2M  
DATUM: MLW



-73 26.00 -73 27.00 -73 28.00 -73 29.00 -73 30.00

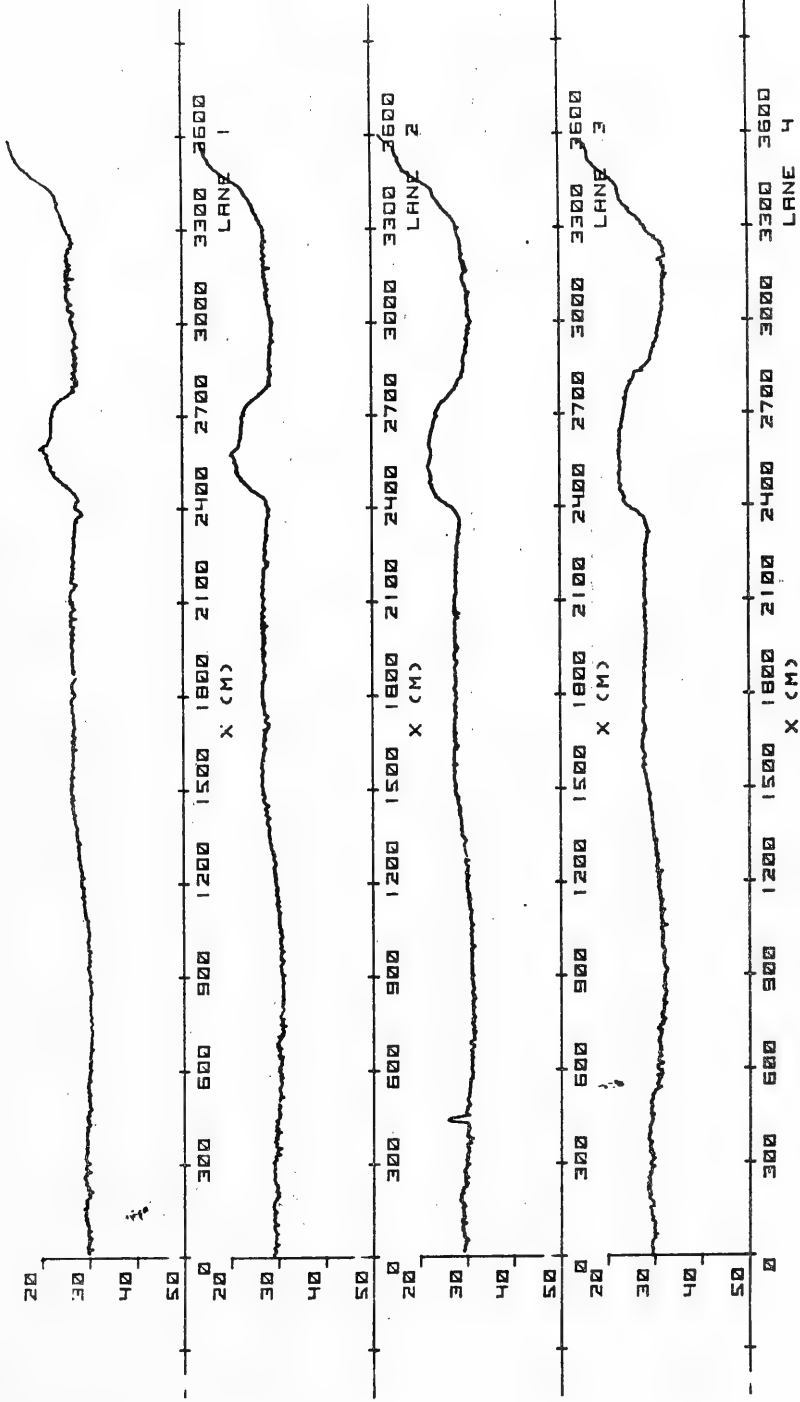
41 0.00 41 0.00 41 0.00 41 0.00

46 53.00 46 53.00 46 53.00 46 53.00

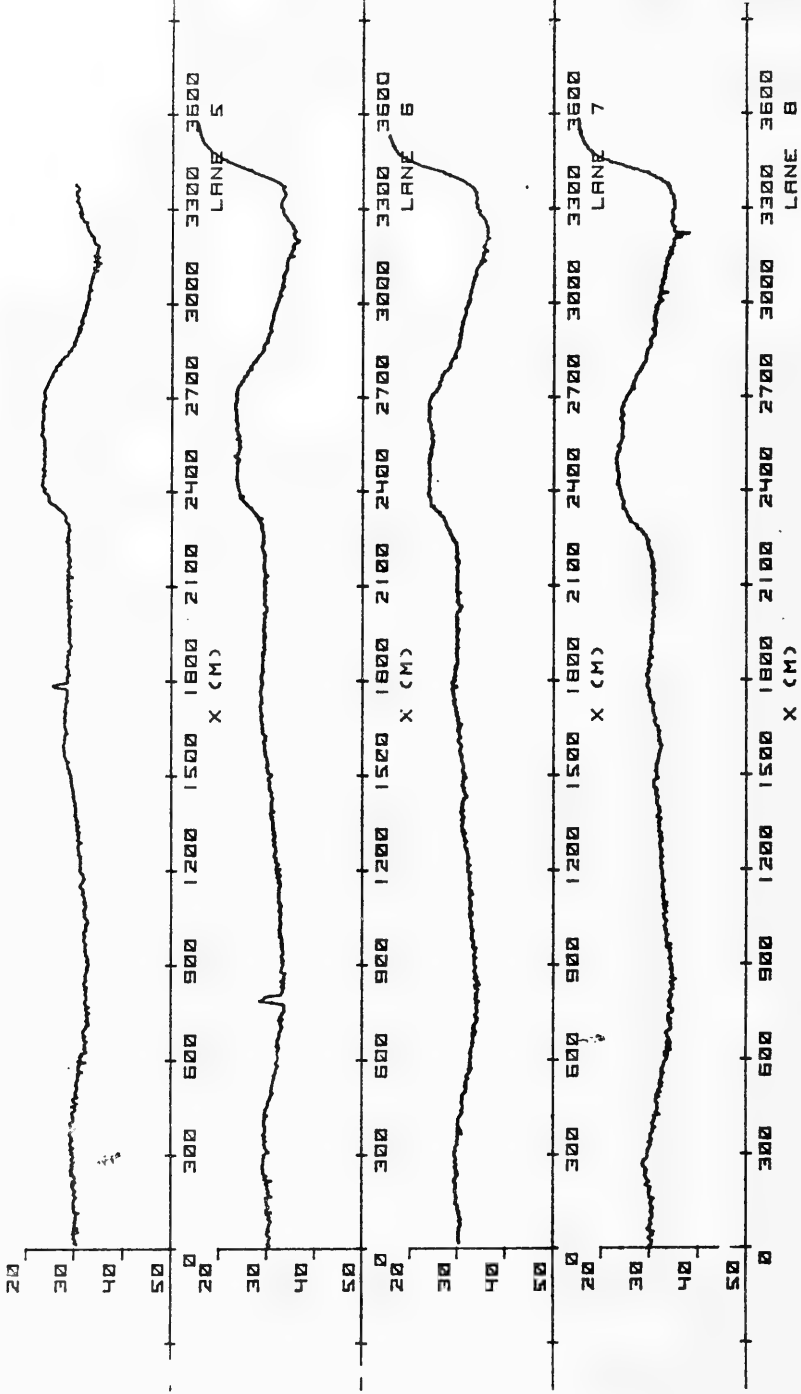
48 03.00 48 03.00 48 03.00 48 03.00

-73 26.00 -73 27.00 -73 28.00 -73 29.00 -73 30.00

CABLE AND ANCHOR REEF  
 FEBRUARY 9, 1978  
 LANE, CENTER, 75.0M  
 VERTICAL EXAGGERATION, 15X



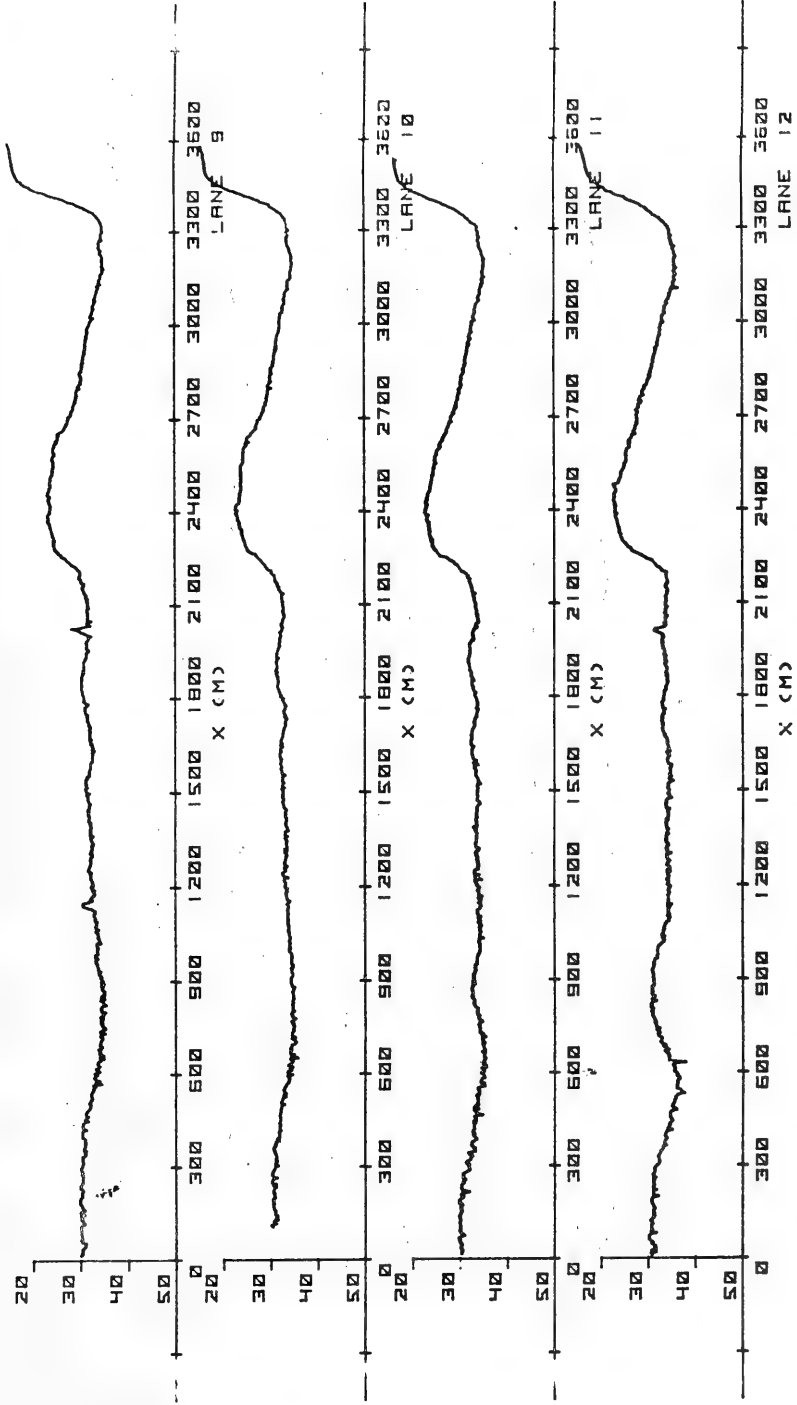
CABLE AND ANCHOR REEF  
FEBRUARY 9, 1978  
LANE INTERVAL: 50M  
VERTICAL EXAGGERATION: 15X



I-5c

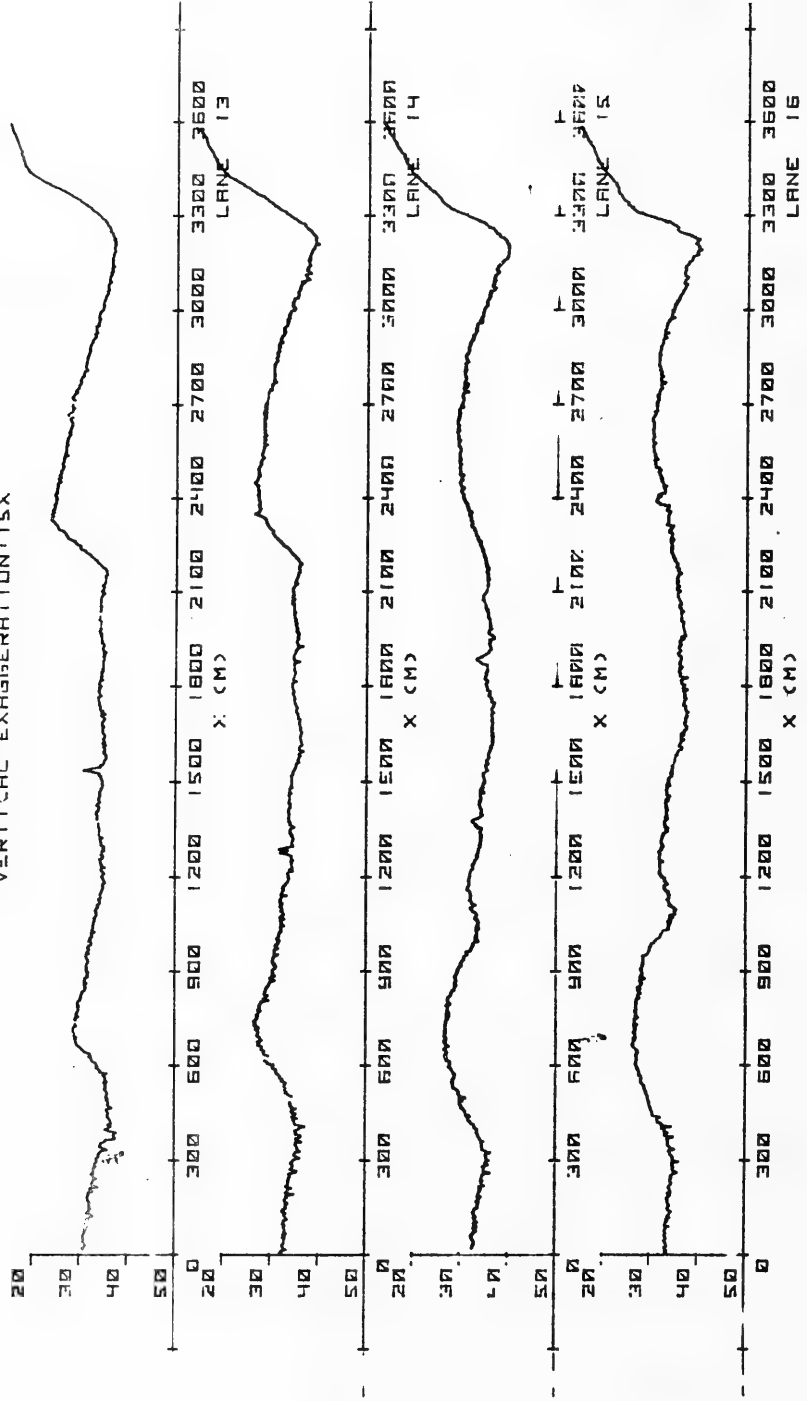


CABLE AND ANCHOR REEF  
 FEBRUARY 9, 1978  
 LANE INTERVAL: 50M  
 VERTICAL EXAGGERATION: 1:5X



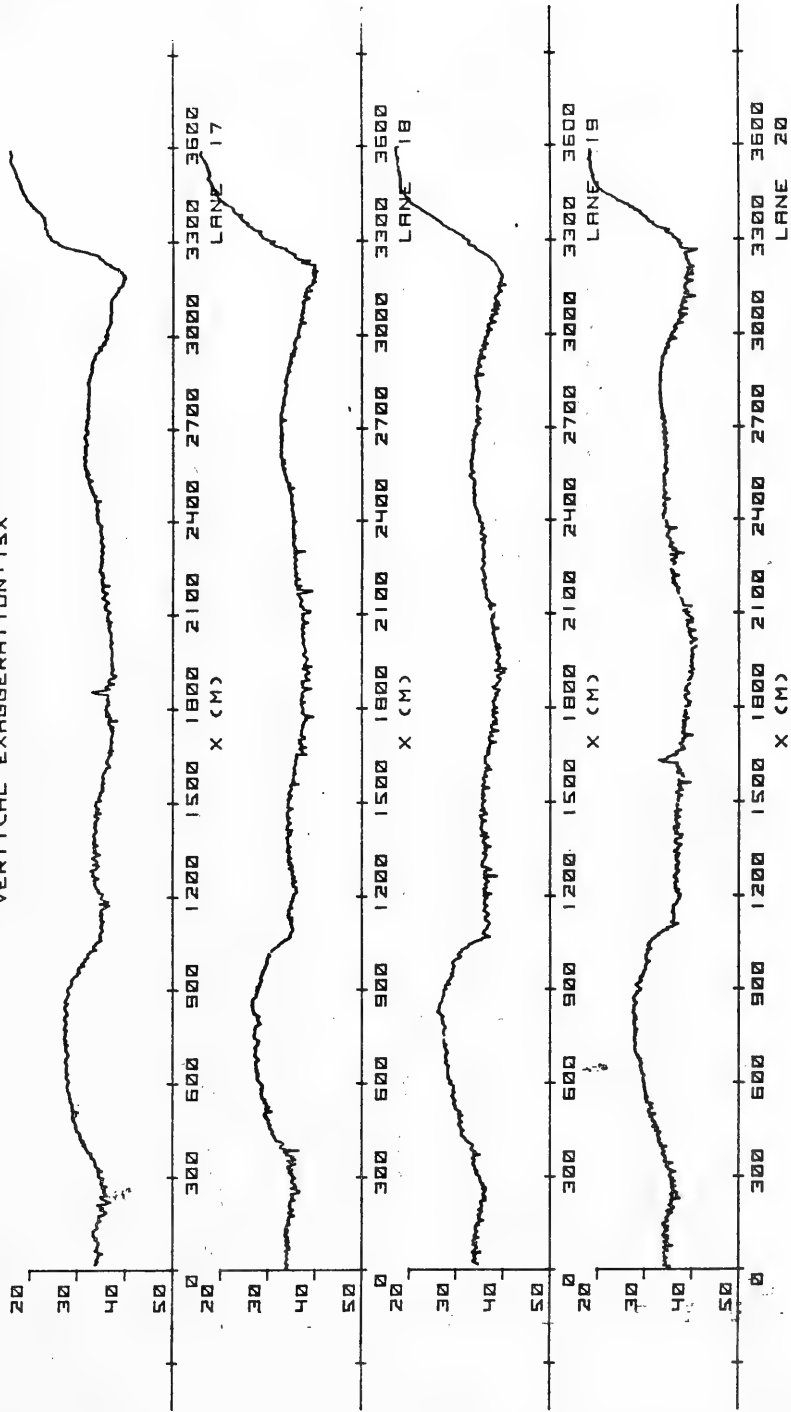
J-5d

CABLE AND ANCHOR REEF  
 FEBRUARY 9, 1978  
 LANE INTERVAL 150M  
 VERTICAL EXAGGERATION 1:15X



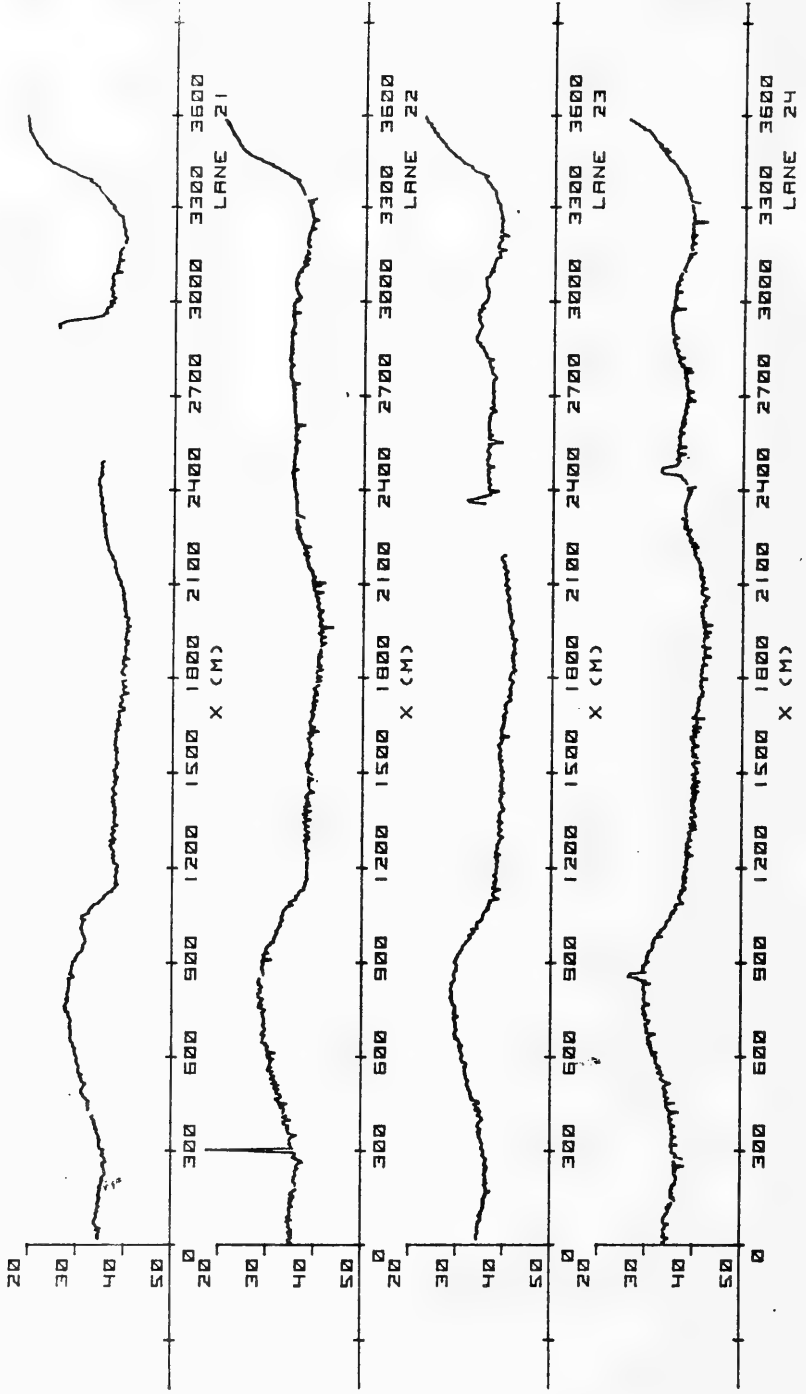
I-5e

CABLE AND ANCHOR REEF  
 FEBRUARY 9, 1978  
 LANE INTERVAL 500M  
 VERTICAL EXAGGERATION 15X



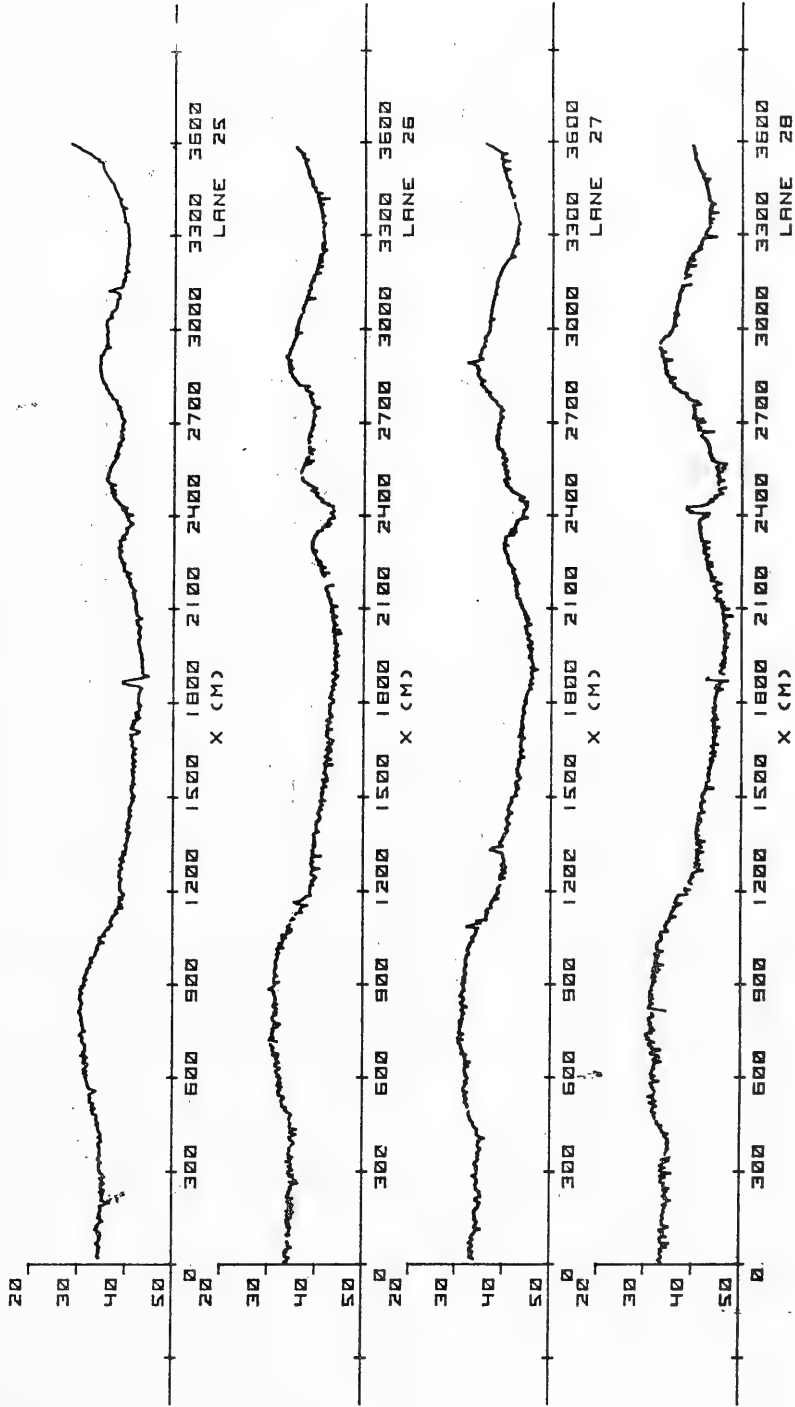
I-5f

CABLE AND ANCHOR REEF  
FEBRUARY 9, 1978  
LANE INTERVAL: 50M  
VERTICAL EXAGGERATION: 15X



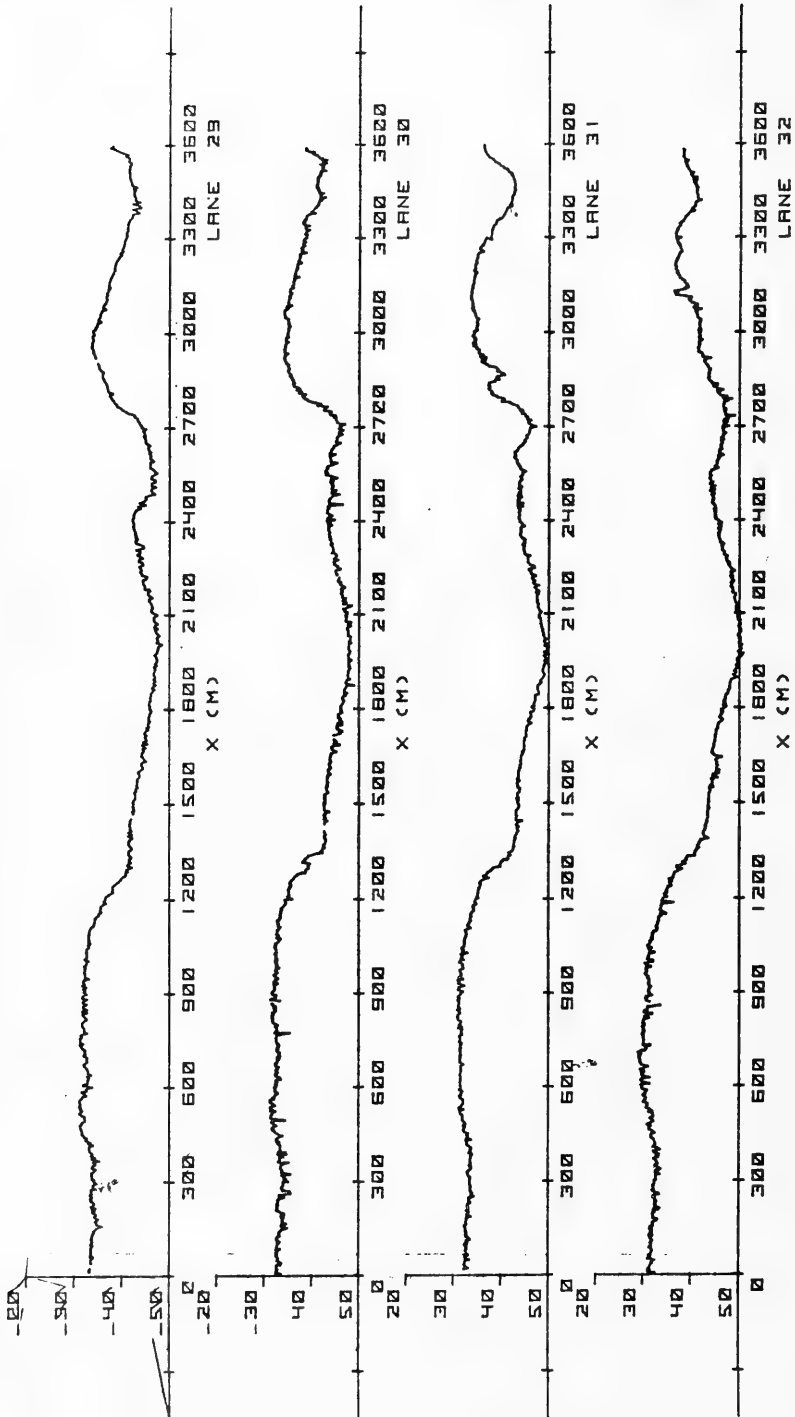
55-T

CABLE AND ANCHOR REEF  
FEBRUARY 9, 1979  
LANE INTERVAL: 50M  
VERTICAL EXAGGERATION: 15X



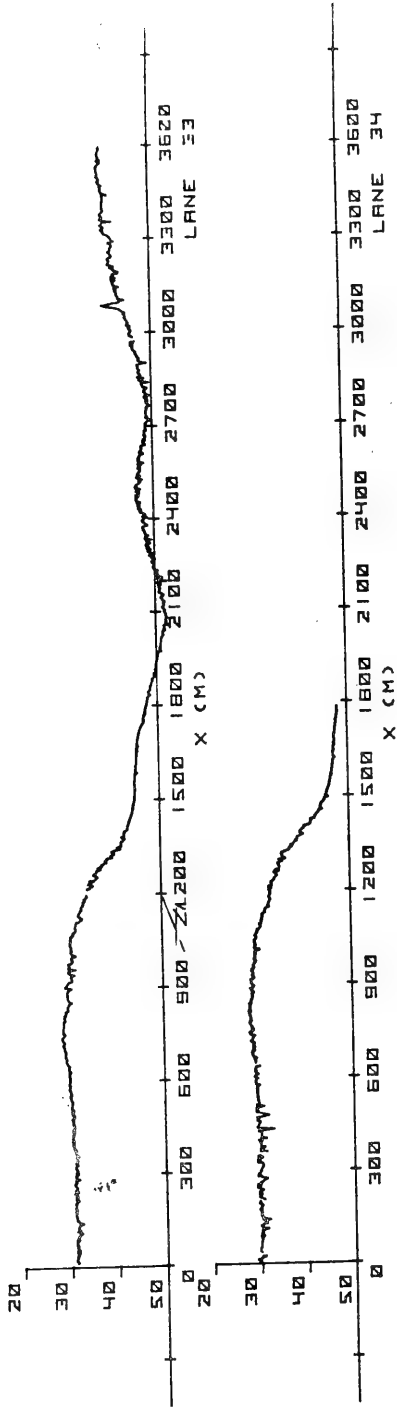
I-5H

CABLE AND ANCHOR REEF  
 FEBRUARY 9, 1979  
 LANE INTERVAL: 50M  
 VERTICAL EXAGGERATION: 15X



I-51

CABLE AND ANCHOR REEF  
 FEBRUARY 9, 1978  
 LANE INTERVAL: 50M  
 VERTICAL EXAGGERATION: 15X



I-SJ

-73 28.00 -73 27.50 -73 26.50 -73 25.00 -73 24.00

CABLE AND ANCHOR REEF  
JULY 26, 1978  
LANE INTERVAL: 50M  
GRID RESOLUTION: 100X50M  
CONTOUR INTERVAL: 2M  
DATUM: MLLW



7 0 1

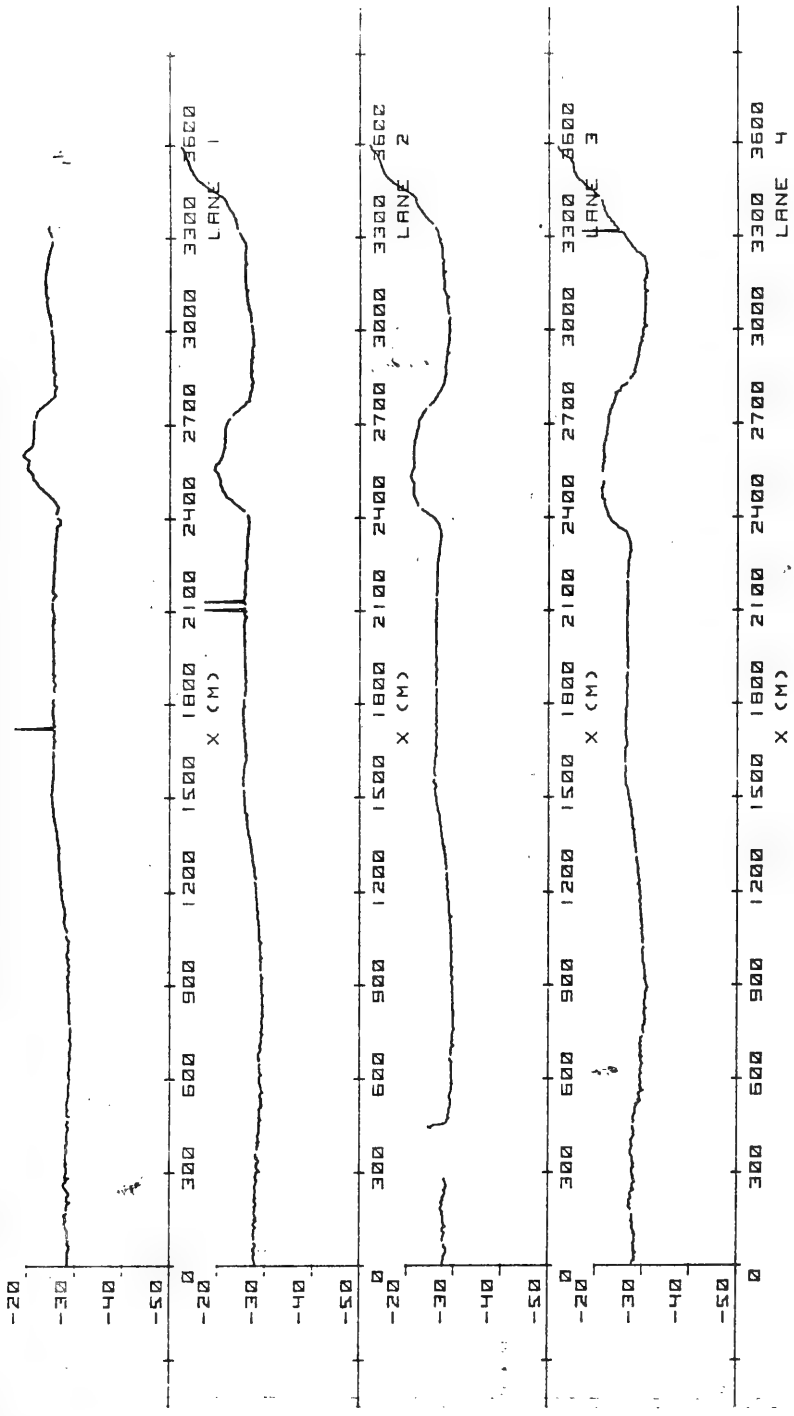
T-6a



CABLE AND ANCHOR REEF  
JULY 26, 1978  
LANE INTERVAL: 50M  
VERTICAL EXAGGERATION: 15X

EAST

WEST

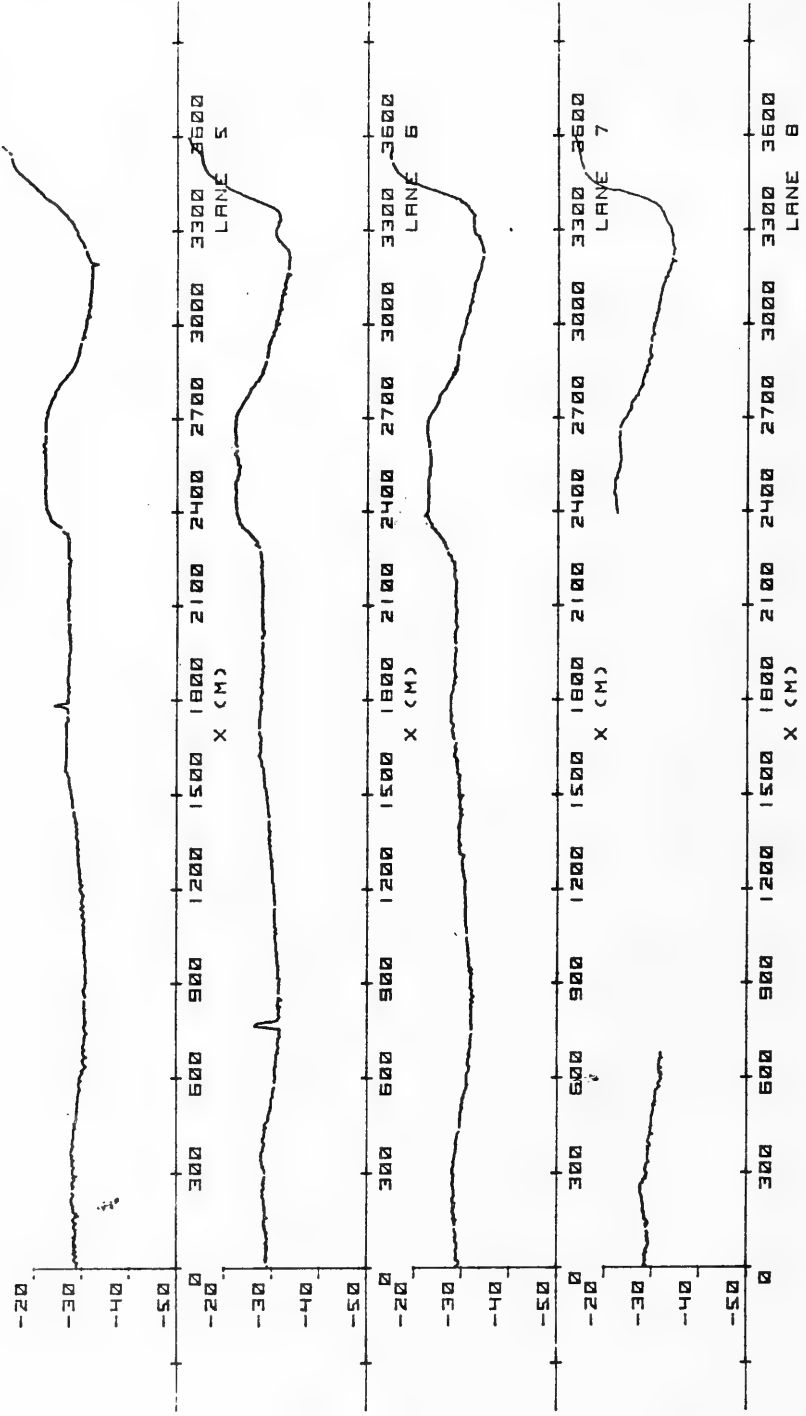


J-66

CABLE AND ANCHOR REEF  
JULY 26, 1978  
LANE INTERVAL: 50M  
VERTICAL EXAGGERATION: 15X

WEST

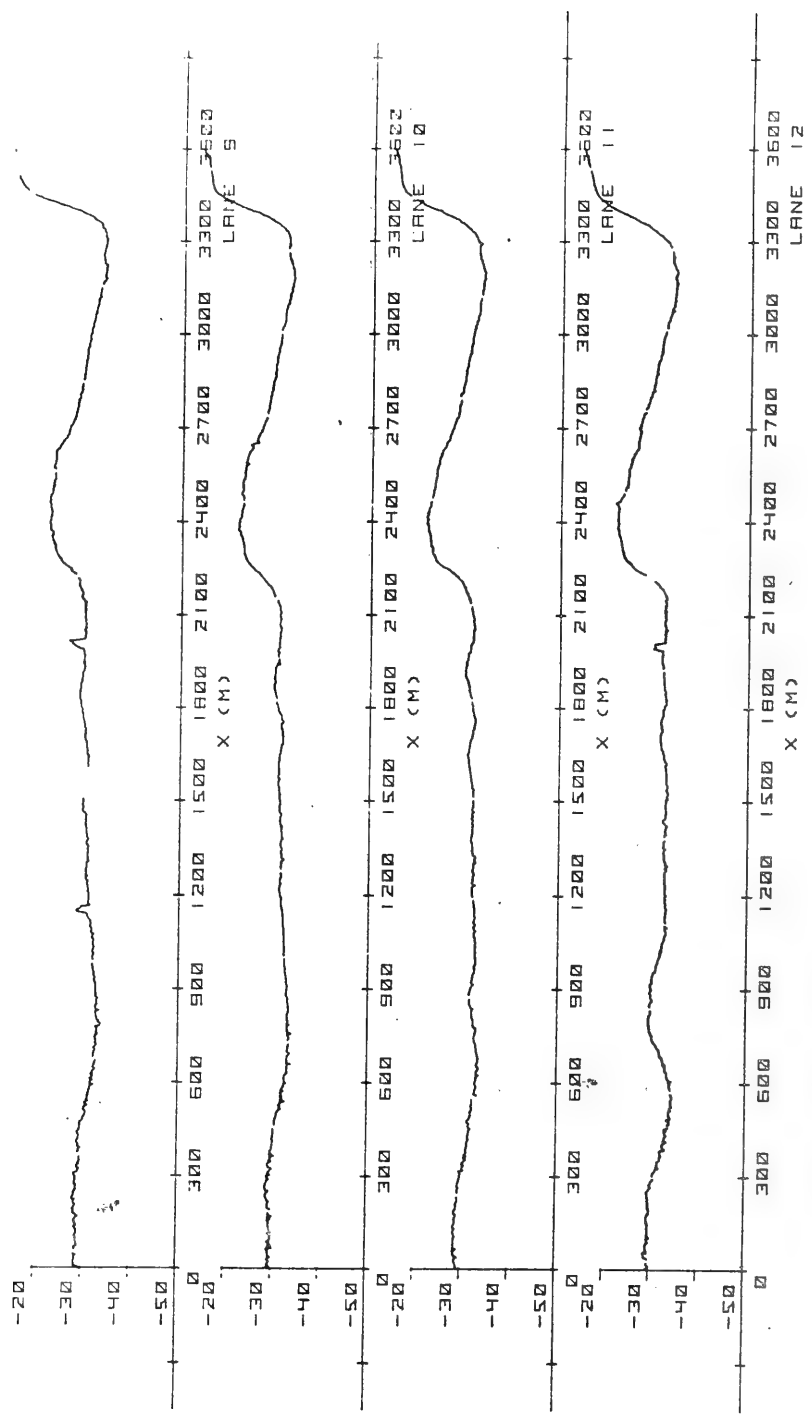
EAST



CABLE AND ANCHOR REEF  
JULY 26, 1978  
LANE INTERVAL: 50M  
VERTICAL EXAGGERATION: 15X

WEST

EAST

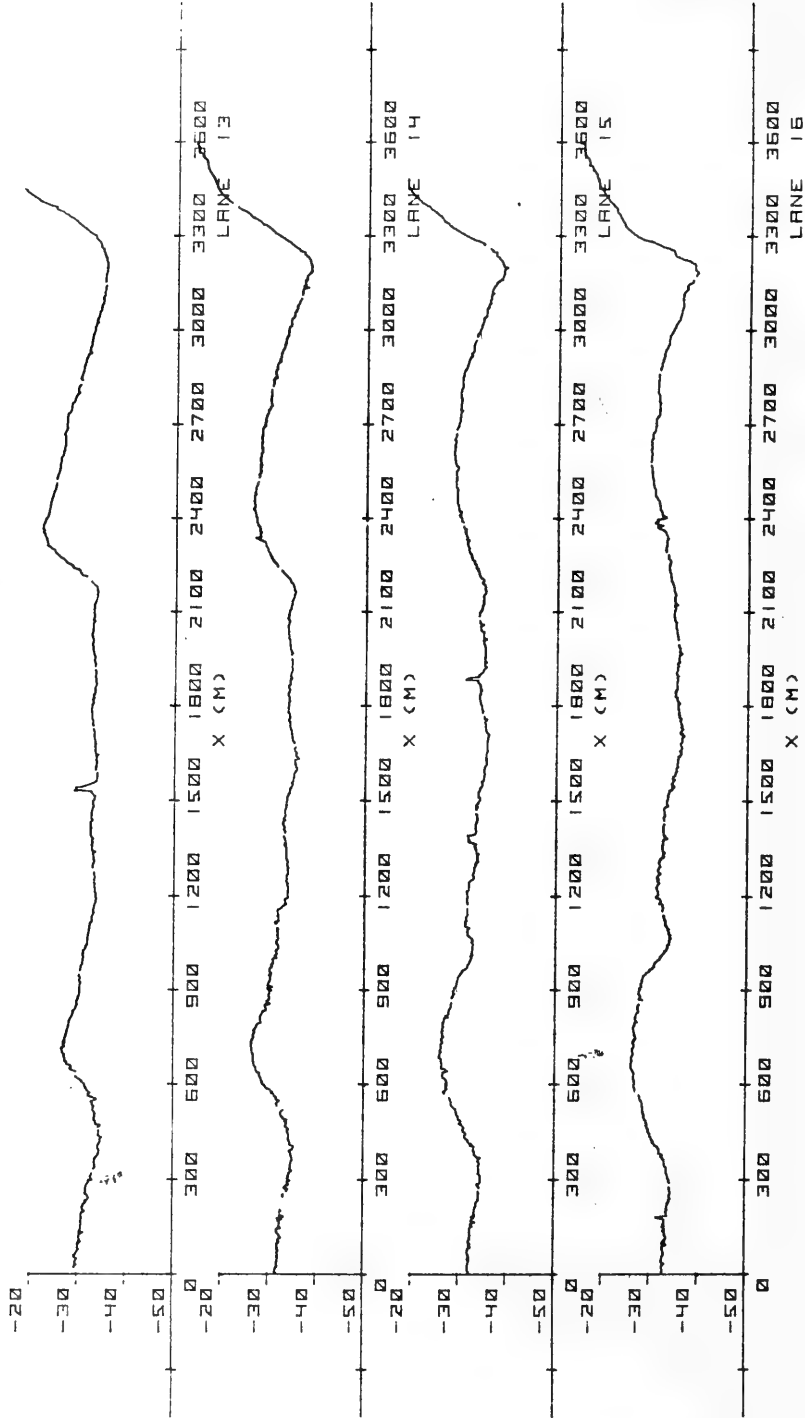


I-6d

CABLE AND ANCHOR REEF  
JULY 26, 1978  
LANE INTERVAL, 50M  
VERTICAL EXAGGERATION: 15X

WEST

EAST

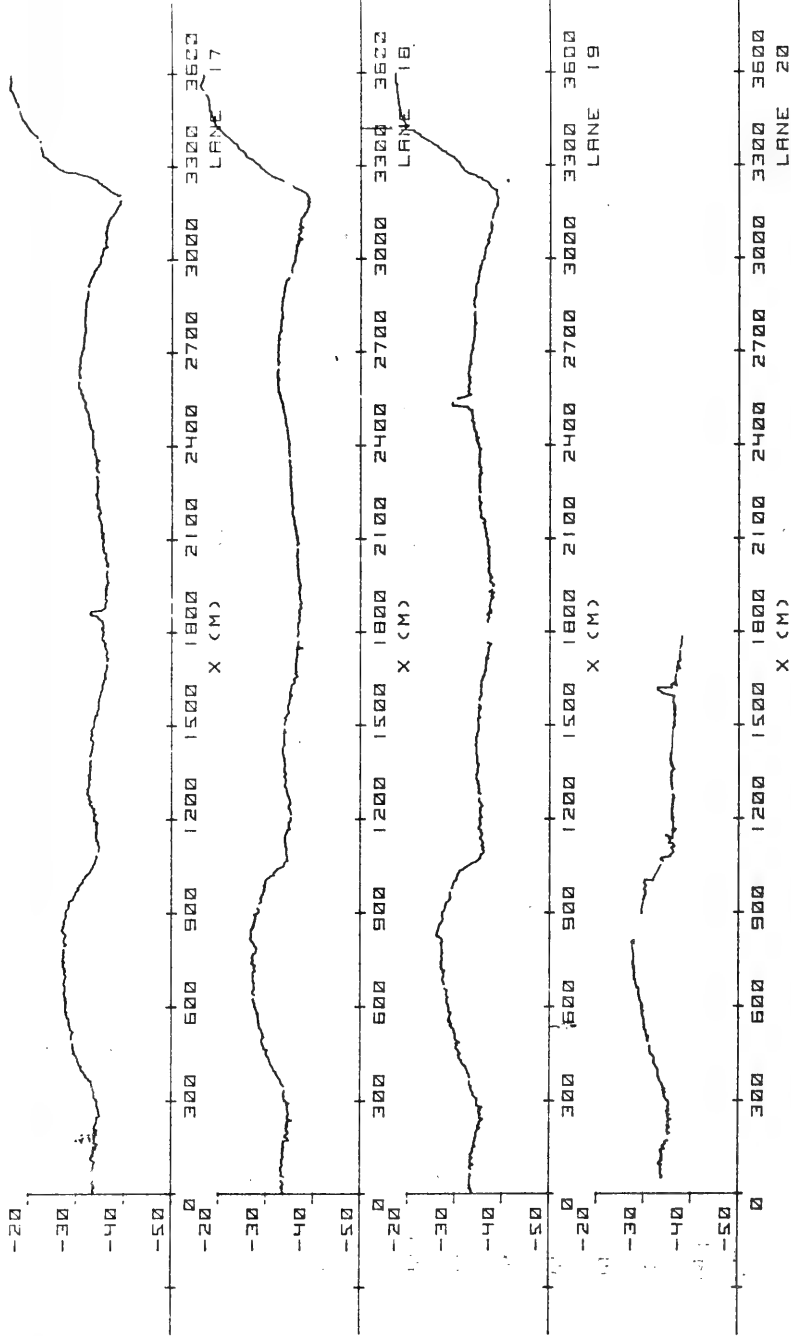


Z-6e

CABLE AND ANCHOR REEF  
JULY 25, 1978  
LANE INTERVAL: 50M  
VERTICAL EXAGGERATION: 15X

WEST

EAST

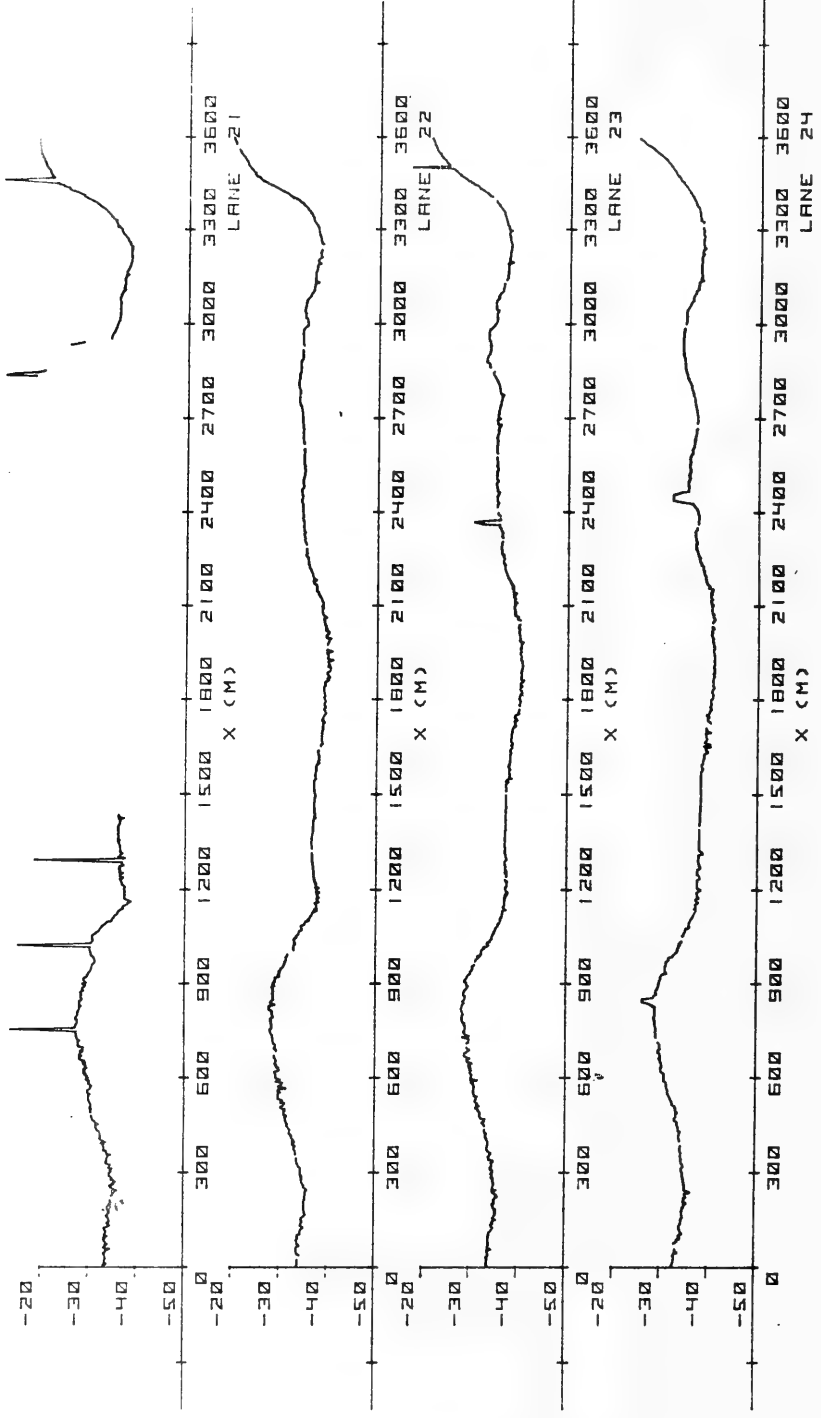


19-7

CABLE AND ANCHOR REEF  
JULY 26, 1978  
LANE INTERVAL: 50M  
VERTICAL EXAGGERATION: 15X

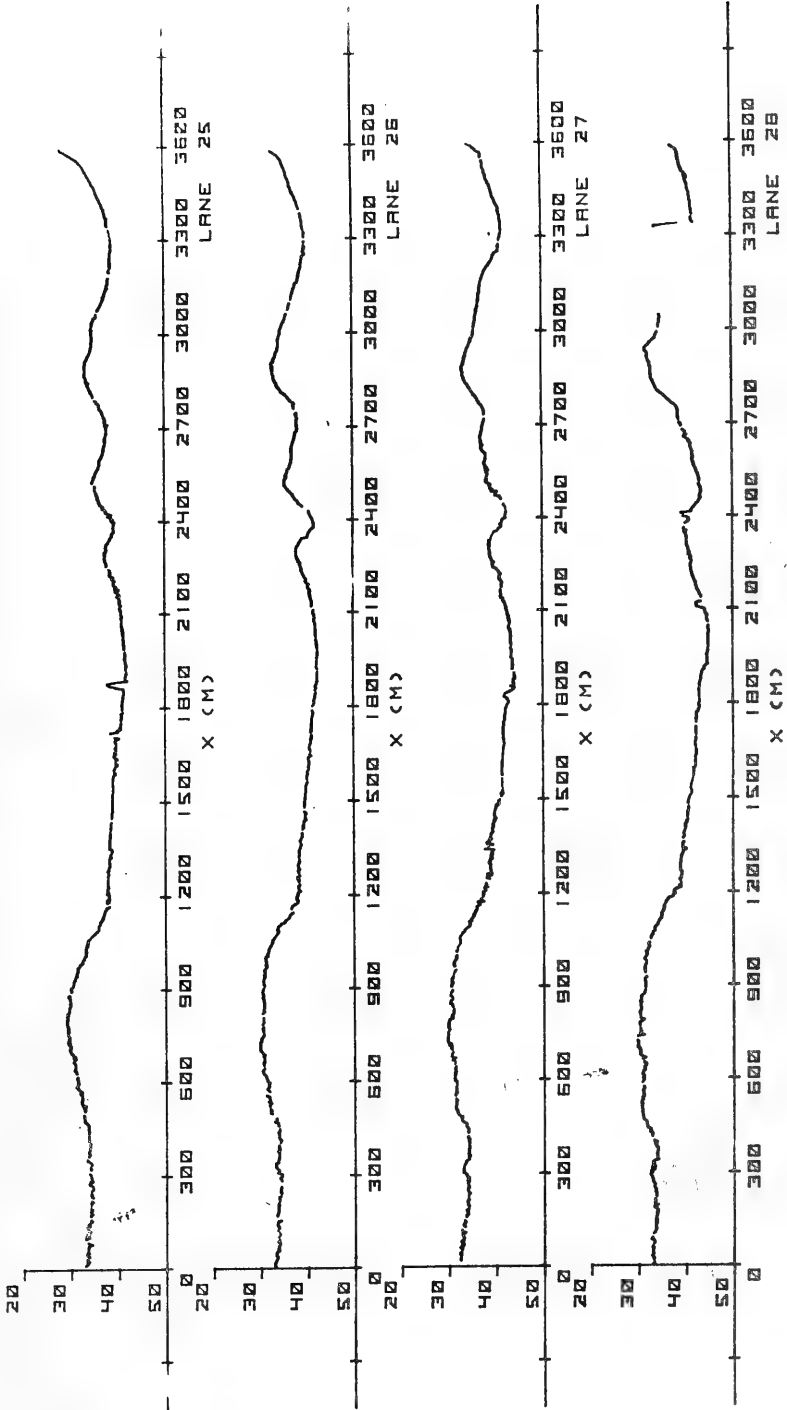
WEST

EAST



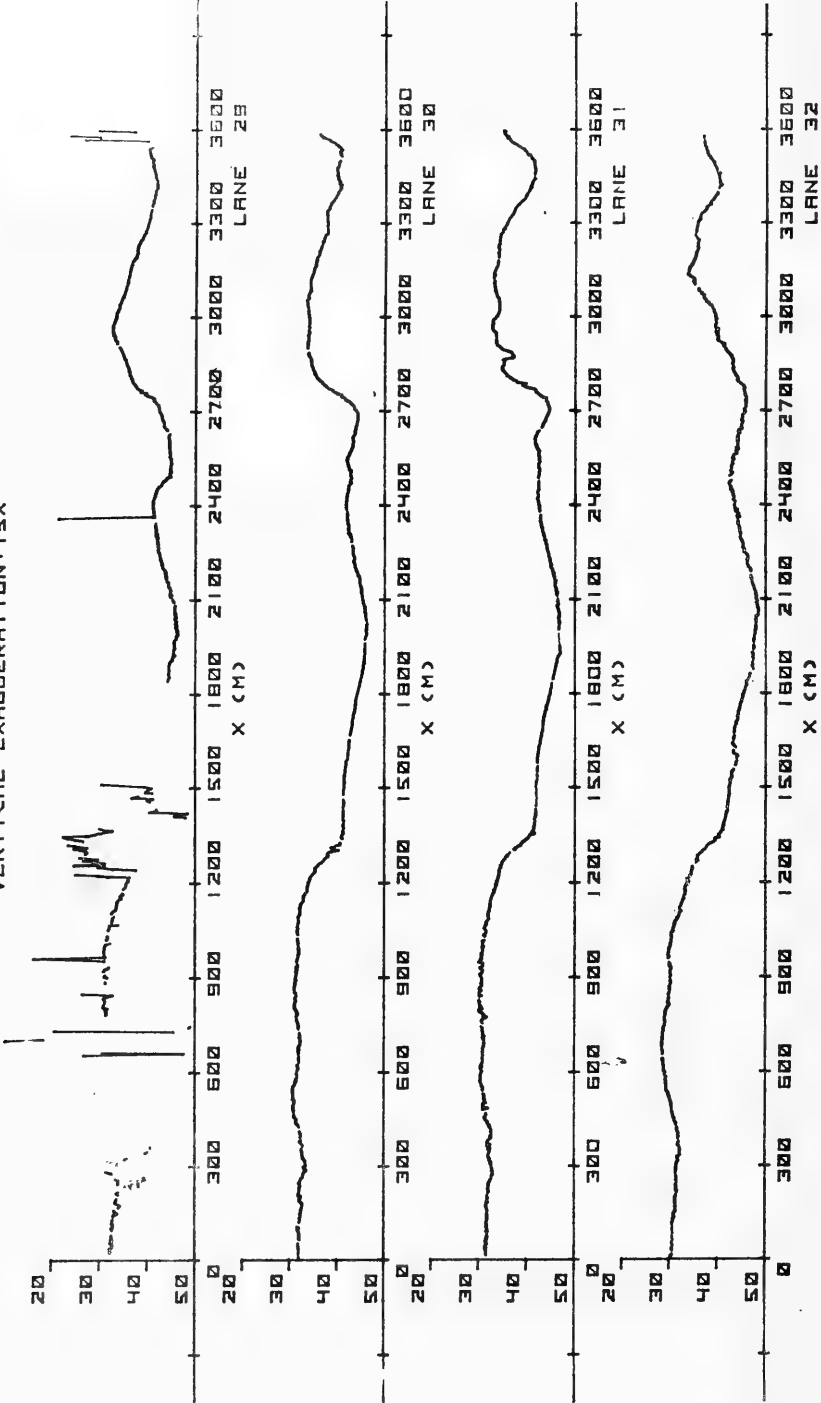
59-1

CABLE AND ANCHOR REEF  
FEBRUARY 9, 1979  
LANE INTERVAL: 50M  
VERTICAL EXAGGERATION



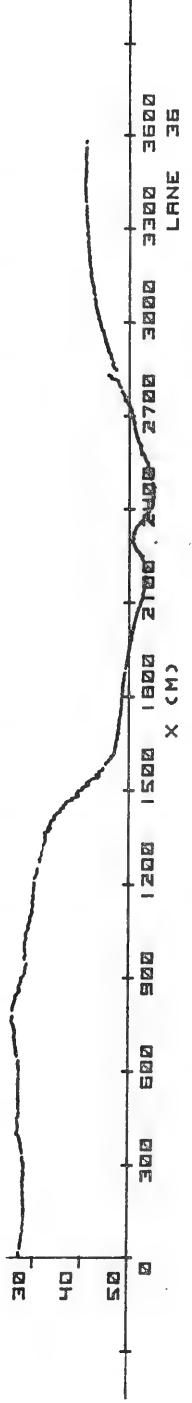
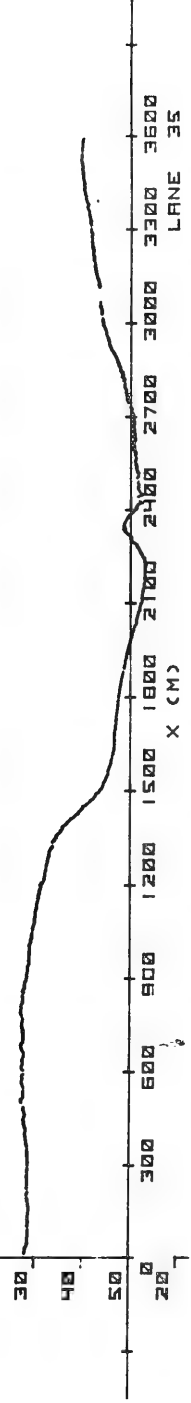
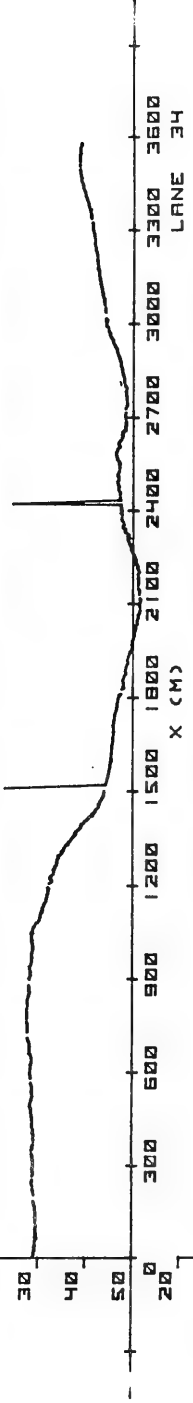
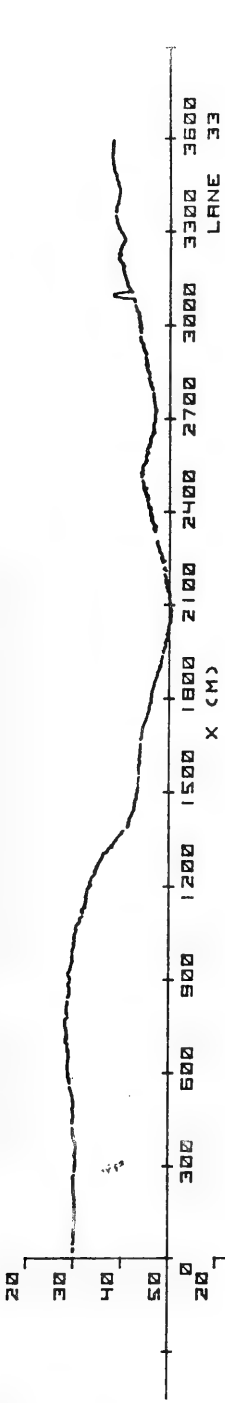
7-6H

CABLE AND ANCHOR REEF  
 JULY 26, 1978  
 LANE INTERVAL .50M  
 VERTICAL EXAGGERATION .15X



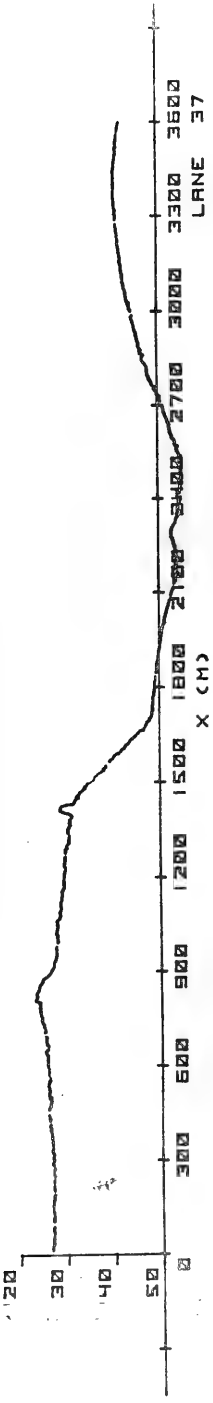


CABLE AND ANCHOR REEF  
 JULY 25, 1978  
 LANE INTERVAL 150M  
 VERTICAL EXAGGERATION 15X

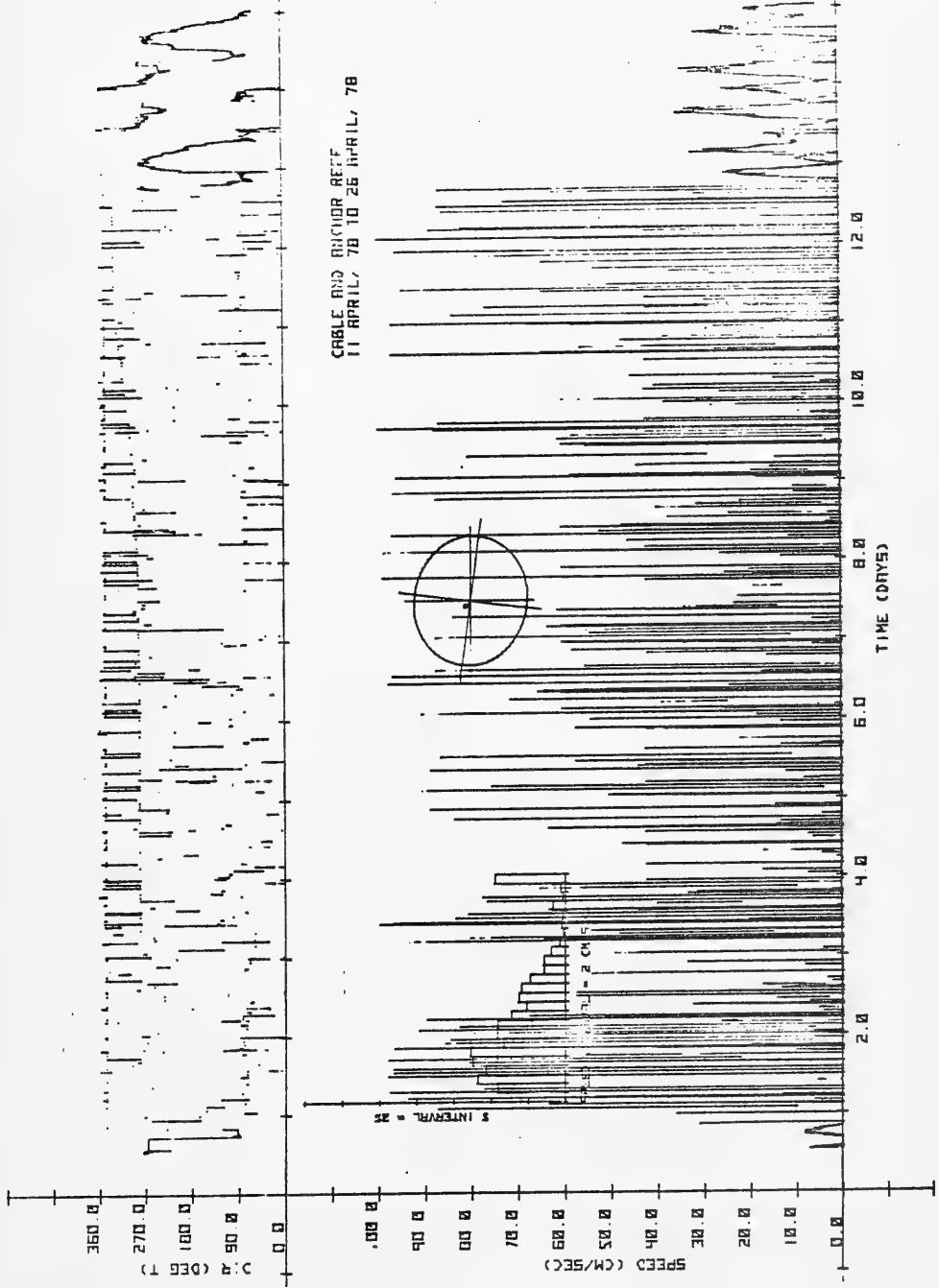


I-6j

CABLE AND ANCHOR REEF  
JULY 26, 1978  
LANE INTERVAL: 50M  
VERTICAL EXAGGERATION: 15X



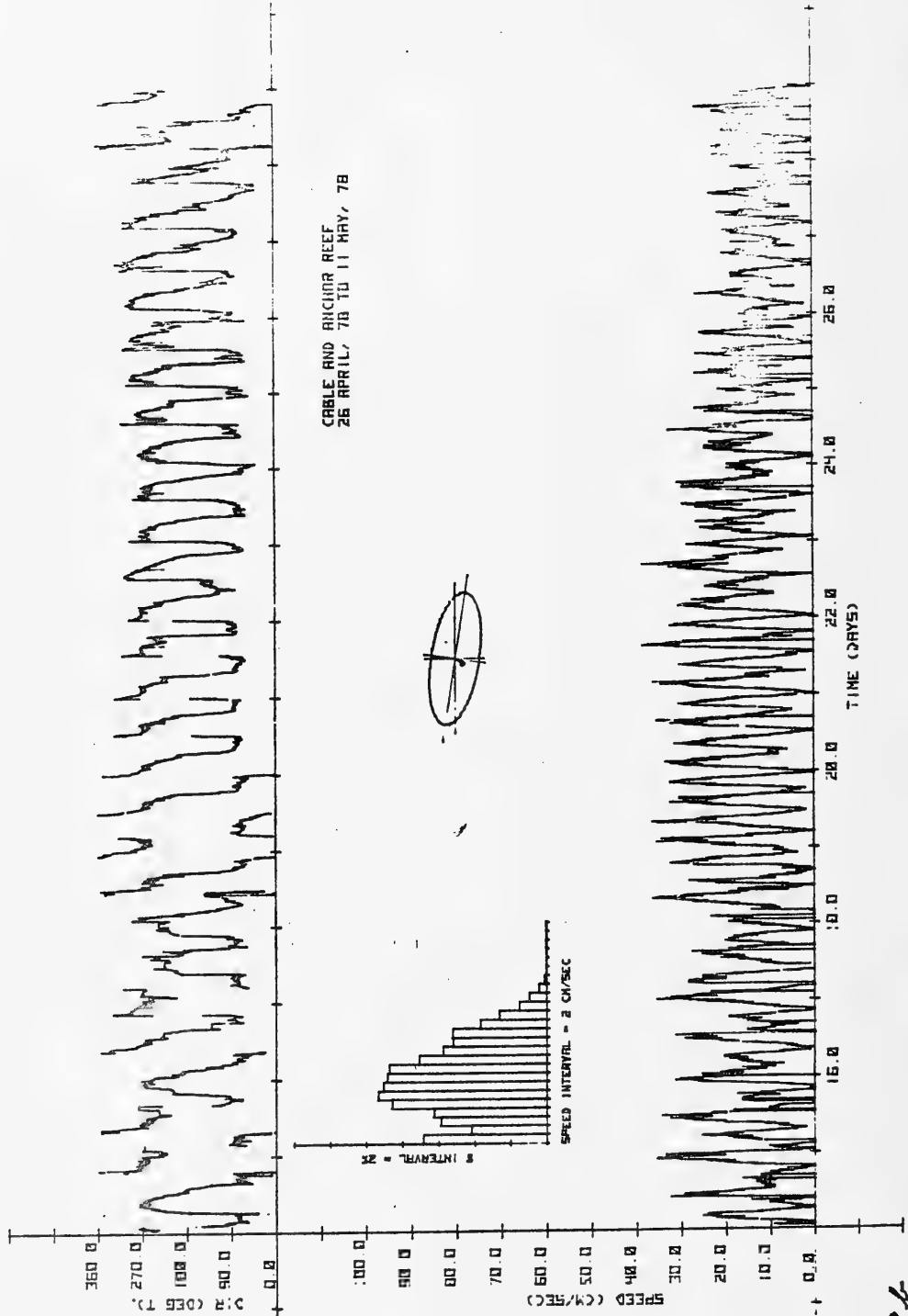
I-6k

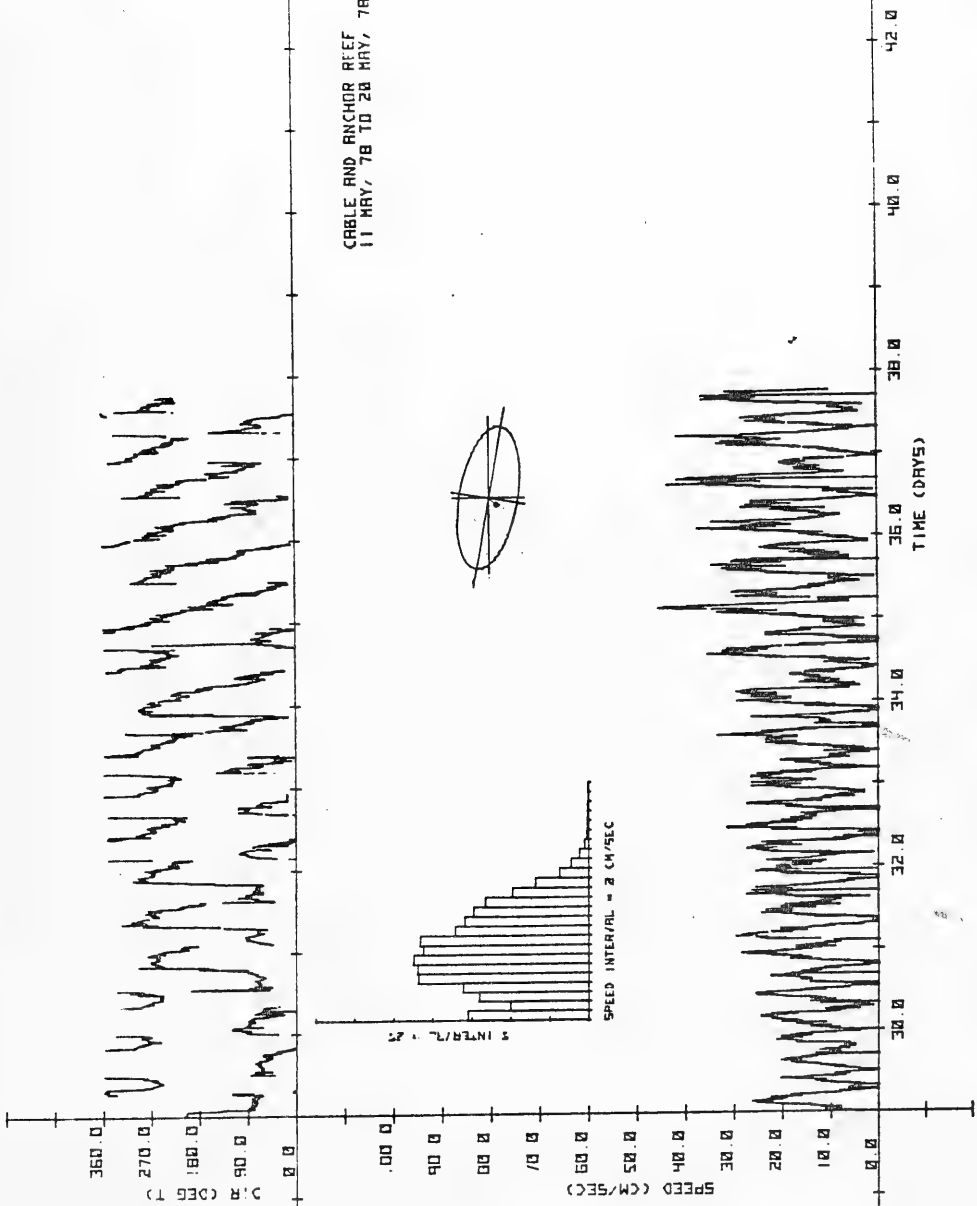


CABLE AND ANCHOR REEF  
 11 APRIL, 78 TO 26 APRIL, 78

I-9a

76 I





WESTERN LONG ISLAND SOUND  
12 April-1 July, 1978

TABLE I-1

	Total OBS. Current	Tidal Cur- rent Inc. Mean	Residual Current	Mean Current
Semi-major axis (cm/sec)	16.9	16.17	8.92	-
Semi-minor axis (cm/sec)	5.5	4.11	4.42	-
Direction (°T)	73.7	-	-	-
Horizontal Kinetic energy (cm <sup>2</sup> /sec <sup>2</sup> )	157.90	139.23	49.55	30.88
10% Highest speeds (cm/sec)	40.1 9.9%	-	-	-
Peak speed (cm/sec)	-	28.35	-	-
Average maximum speed (cm/sec)	-	23.60	-	-

WESTERN LONG ISLAND SOUND  
26 July-7 Sept., 1978

TABLE I-2

	Total OBS. Current	Tidal Cur- rent Inc. Mean	Residual Current	Mean Current
Semi-major axis (cm/sec)	19.3	18.30	10.64	-
Semi-minor axis (cm/sec)	7.0	7.61	4.71	-
Direction (°T)	67.0	-	-	-
Horizontal Kinetic energy (cm <sup>2</sup> /sec <sup>2</sup> )	210.65	196.35	67.60	53.43
10% Highest speeds (cm/sec)	44.0 9.5%	-	-	-
Peak speed (cm/sec)	-	32.98	-	-
Average maximum speed (cm/sec)	-	28.02	-	-

## CABLE AND ANCHOR REEF

11 April-20 May, 1978

TABLE I-3

	Total OBS. Current	Tidal Cur- rent Inc. Mean	Residual Current	Mean Current
Semi-major axis (cm/sec)	15.3	14.13	6.11	-
Semi-minor axis (cm/sec)	6.0	3.75	4.80	-
Direction (°T)	79.6	-	-	-
Horizontal Kinetic energy (cm <sup>2</sup> /sec <sup>2</sup> )	134.70	106.88	30.19	2.37
10% Highest speeds (cm/sec)	29.6 10%	-	-	-
Peak speed (cm/sec)	-	28.13	-	-
Average maximum speed (cm/sec)	-	20.68	-	-

The burst of energy resulting from the easterly storm that occurred in the New Haven current data appears at the end of day 32 of the Western Long Island Sound data. At New Haven, the effect of the storm could be seen through two tidal cycles while in this set of data a single peak of 65 cm/sec was observed, that is more than twice the average maximum speed.

At the Cable and Anchor Reef station, located approximately 2 NM west of the Western Long Island Sound Station, the currents are significantly less. The 10% highest speeds at Western Long Island Sound are on the order of 40-45 cm/sec while at Cable and Anchor Reef, they are only 30 cm/sec. It should be noted,

however, that the tidal kinetic energy less the mean current results in similar values of 109 dynes/sec and 106 dynes/sec respectively for the same period of time. Residual and mean current components are substantially lower for the Cable and Anchor record.

It is interesting that no indication of the anomalous high current velocities caused by the storm at New Haven and Western Long Island Sound are present at Cable and Anchor Reef. The higher velocities were all directed westward, hence, the meter at this site may have been in the lee of shoals east of the mooring location. However, it is doubtful that such a major burst of energy would be completely lost, since normal tidal flow has a significant westerly component at this site.

#### Sediments

Data resulting from the heavy metal analysis of sediments from the Western Long Island Sound area are presented in Table I-4. Although the Cable and Anchor Reef stations generally have higher concentrations than those from Western Long Island Sound, both sites are similar and significantly higher than all other areas sampled in this study. Since the background sediments at the Western Long Island Sound site are so high, it is doubtful that spoils would be easily detected at this location based on chemical data.

#### Biochemical Studies

Mussels from Latimer's Light were deployed at the proposed Western Long Island Sound disposal site at  $41^{\circ}00'51.9''$  N,  $73^{\circ}21'16.5''$  W, at the Cable and Anchor Reef site at  $41^{\circ}00'27.6''$  N,  $73^{\circ}26'10''$  W, and at a common reference station at  $41^{\circ}23'24.8''$  N,  $73^{\circ}23'52.3''$  W. Both of the stations on the disposal sites were sampled in July, 1978, but the release mechanism on the reference site



TABLE I-4

## LONG ISLAND SOUND DUMP SITES

## SURFACE SEDIMENT ANALYSIS

SAMPLING	Cd	Co	Cr	Cu	Fe*	Hg	Ni	Pb	Zn	Vol/Sol (%)	Oil/Crease (ppm)
APRIL 1978											
CAR Ref	.31	8.1	31	20	1.2	.18	14	17	70	3.0	
CAR 1	.37	9.6	43	60	2.0	.30	55	59	144	11	6.8
CAR 3	.86	8.0	52	69	1.6	.56	49	75	138	7.0	1.6
WLIS 1	.61	4.4	34	43	1.3	.23	32	34	110	7.6	.9
WLIS 2	.62	8.3	39	49	1.5	.26	41	43	121	8.1	4.8
WLIS 3	.36	7.6	35	48	1.5	.18	35	35	111	6.8	1.8
WLIS R1	.25	8.7	39	60	1.8	.28	41	29	124	6.2	.9
JULY 1978											
CAR 1	.83	8.5	74	78	1.6	.69	22	69	184	19	
CAR 2	.72	7.8	64	61	1.6	.69	22	64	169	12	
CAR 3	.99	9.5	84	86	1.7	.48	26	71	218	22	
CAR, WLIS Ref 1	.75	8.7	73	76	1.6	.28	21	45	173	15	
WLIS 1	.50	8.0	58	61	1.4	.22	18	37	147	8.7	
% S.D.	25	9	5	7	3	14	5	13	15	5	15

\*All Fe values multiply by 10<sup>4</sup>

## SAMPLE LOCATIONS

SITE: WLIS (Western Long Island Sound)

DATE	DISPOSAL SITE:			REFERENCE SITE:		
	CURRENT METER	MUSSELS	BENTHIC SAMPLES DREDGES	MUSSELS	BENTHIC SAMPLES DREDGES	BENTHIC SAMPLES GRABS
12/April/78	41°00'54.5"	41°00'51.9"		41°23'24.8"		
	73°21'18.6"	73°21'16.5"		73°23'52.3"		
26/July/78		Sample				
27/July/78			41°00'40.4"	41°01'05.7"		
			73°21'01.8"	73°23'56.7"		

+ Same Ref. for CAB/ANC.

## Western Long Island Sound

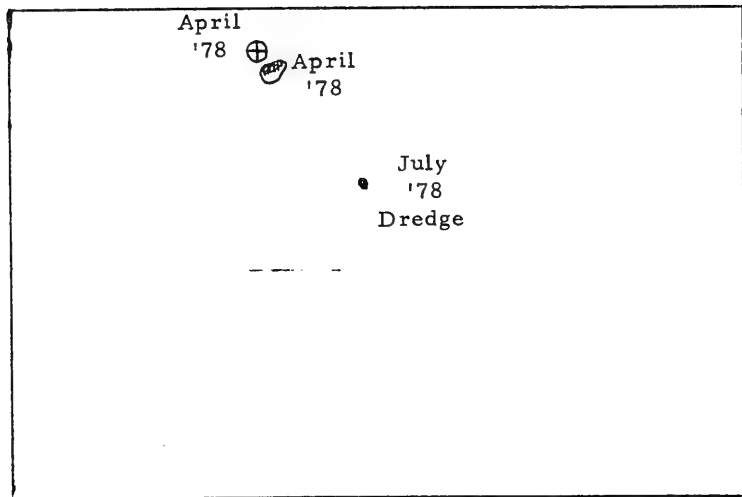

 $\oplus$  Current Meter Mussell Cage $\bullet$  Benthic Sample

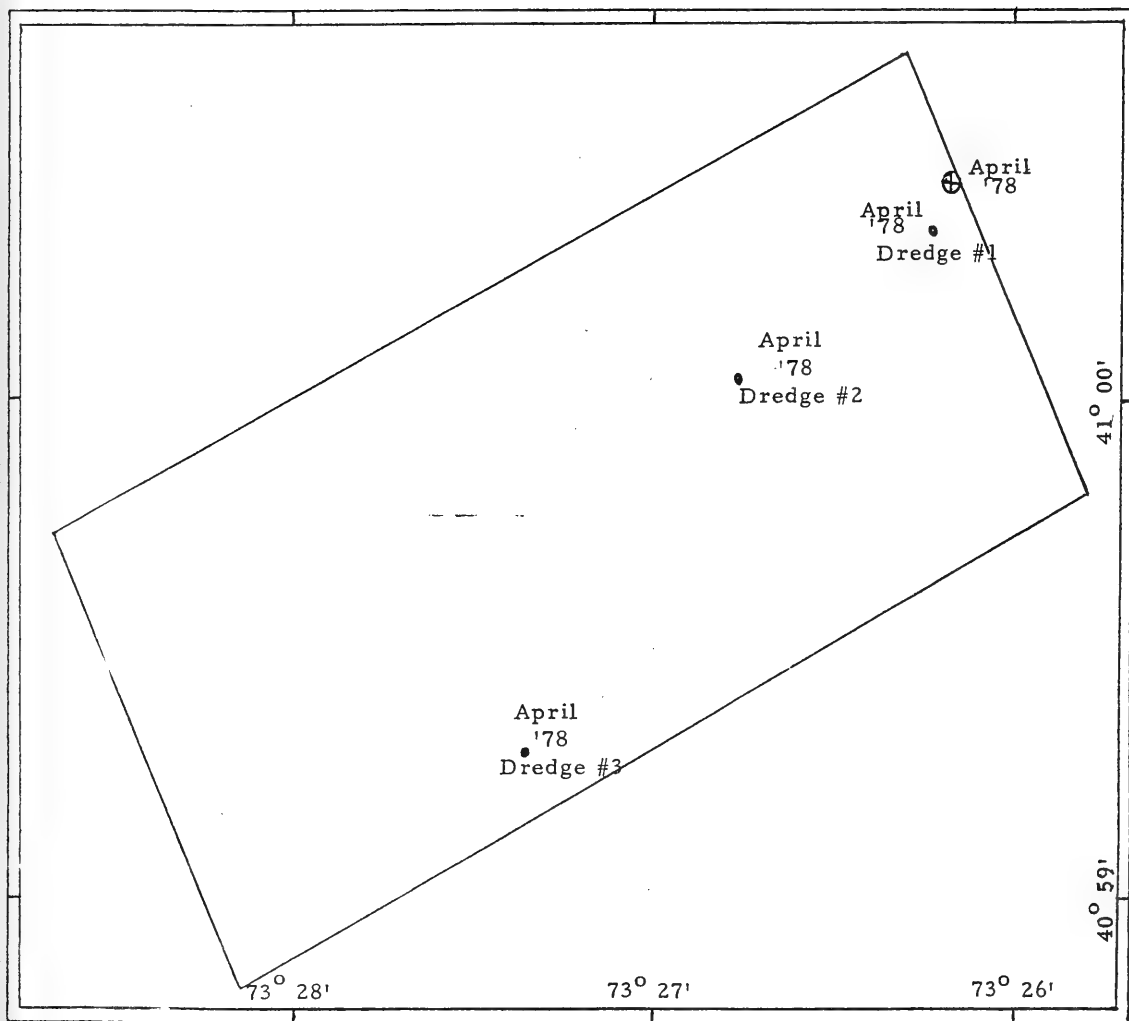
TABLE I-4b  
SAMPLE LOCATIONS

SITE: Cable and Anchor Reef

DATE	DISPOSAL SITE:		REFERENCE SITE				
	CURRENT METER	MUSSELS	BENTHIC SAMPLES DREDGES	BENTHIC SAMPLES GRABS	MUSSELS	BENTHIC SAMPLES DREDGES	BENTHIC SAMPLES GRABS
11/April/78	41°00'27.6" 73°26'10.0"	(?)	41°00'21.5" 73°26'14.5"			41°01'05.7" 73°23'56.7"	+
11/April/78			41°00'02.7" 73°26'47.6"				
11/April/78			40°59'19.7" 73°27'19.6"				
28/July/78							
12/April/78							

+ Same Ref. For ALLIS

## Cable and Anchor Reef



⊕ Current Meter

● Benthic Samples

ailed and no samples were obtained. The baseline data and results from the cages are presented in Table I-5 and Figure I-10. At both disposal sites the behavior of the mussels was similar with Cd and Cu showing significant increases in concentration while Zn approached but did not exceed the confidence limits.

Following sampling in July, the Western Long Island Sound cage was destroyed by a dragger and problems were experienced retrieving the cage at Cable and Anchor Reef. It appears that the large amount of fishing activity in this area will severely restrict the use of instrumentation in this area.

Benthic Macrofauna

The numeric density data of the benthic population in Western Long Island Sound are presented in Tables I-6, I-7, and I-8. The most significant factor noticed in this area is the comparatively low number of individuals sampled relative to other sites in this study. Values for Diversity and Equitability are similar for all three stations.

Fisheries

The major objective of fisheries studies in this area is to map fisheries in the area east of Cable and Anchor Reef for a distance of approximately 7 miles. This information will be used along with bottom current measurements to choose a possible disposal site. Information on recovery times and fisheries potential of discontinued disposal areas is also being collected.

Choice of a disposal area in Western Long Island Sound is difficult because almost all of the area deeper than 20 meters is used by commercial lobstermen. Fishermen from different ports are limited to informal "territories" and so are concerned about any reduction in their fishable area.

TABLE I-5. HEAVY METAL CONCENTRATIONS (PPM) IN MYTILUS EDULIS FROM LATIMER'S LIGHT DEPLOYED AT CORNFIELD SHOALS, NEW HAVEN, WLIS AND CABLE AND ANCHOR REEF DISPOSAL SITES (SOUTHERN NEW ENGLAND).

DATE	LOCATION		Cd	Cr	Cu	Hg	Pb	Zn
1-16-78	LATIMER'S LIGHT	$\bar{x}$	2.18	4.34	10.80	0.210	8.58	162
		S.D.	0.32	0.50	0.54	0.028	1.61	23
4-10-78		$\bar{x}$	2.06	7.71	8.53	0.199	5.17	110
		S.D.	0.46	2.88	0.38	0.027	2.29	45
8-9-78		$\bar{x}$	1.37	2.45	8.68	0.169	5.52	112
		S.D.				0.009	1.44	
7-26-78	WLIS DISPOSAL SITE	$\bar{x}$	4.65	5.92	12.14	0.170	4.66	197
		S.D.	0.09	1.59	0.57	0.014	2.25	6
7-27-78	CABLE & ANCHOR REEF DISPOSAL SITE	$\bar{x}$	3.36	6.47	12.72	0.188	5.19	194
		S.D.	0.12	1.15	1.15	0.025	0.01	0.09

TABLE I-6

## DAMOS BENTHOS - TABLE OF NUMERIC DENSITY DATA

WLIS DUMP SITE - 12 APRIL 1978

PREDOMINANT SPECIES	DREDGE NUMBER #1	DREDGE NUMBER #2	DREDGE NUMBER #3	TOTAL MEAN	STANDARD DEVIATION	COEFF. OF DISPERSION	95 PERCENT CONF. LIMITS OF MEAN	NUMERIC RANK	% OF TOTAL	CUMUL. % OF TOTAL
1. Nephythys incisa	2	6	1	9	3.0	2.3	0-9.5	1	47.4	47.4
2. Pherusa affinis	2	1	0	3	1.0	1.0	0-3.5	2	15.8	63.2
3. Corymorpha pendula	0	0	1	1	0.3	1.1	0-1.8	3	5.3	68.5
4. Ceriantbus sp.	1	0	0	1	0.3	1.1	0-1.8	3	5.3	73.8
5. Nassarius trivittatus	0	1	0	1	0.3	1.1	0-1.8	3	5.3	79.1
6. Pitar morrhua	0	1	0	1	0.3	1.1	0-1.8	3	5.3	84.4
7. Glycera americana	0	1	0	1	0.3	1.1	0-1.8	3	5.3	89.7
8. Maldanid sp.	0	1	0	1	0.3	1.1	0-1.8	3	5.3	95.0
9. Pagurus longicarpus	1	0	0	1	0.3	1.1	0-1.8	3	5.3	100.0

TOTAL	6	11	2	19	6.3	3.2	0-17.5			
TOTAL # OF SPP PER DREDGE	4	6	2	9	4.0		0-9.0			
SPECIES DIVERSITY (H')	1.33	1.42	0.69	3.44	1.15					
EQUITABILITY (J')	0.96	0.79	1.00	2.75	0.92					

TOTAL # OF INDIVIDUALS THIS STATION = 19.



TABLE I-7

## DAMOS BENTHOS - TABLE OF NUMERIC DENSITY DATA

CAR DUMP SITE - 11 APRIL 1978

PREDOMINANT SPECIES	DREDGE #1	DREDGE #2	DREDGE #3	TOTAL	MEAN	STANDARD DEVIATION	COEFF. OF DISPERSION	95 PERCENT CONF. LIMITS OF MEAN	NUMERIC RANK	% OF TOTAL	CUMU. % OF TOTAL
1. Nephtys incisa	6	14	7	27	9.0	4.4	2.1	0-15.3	1	60.0	60.0
2. Nucula proxima	6	0	0	6	2.0	3.5	6.0	0-10.7	2	13.3	73.3
3. Nassarius trivittatus	0	1	1	2	0.7	0.6	0.5	0- 2.2	3	4.4	77.7
4. Pitar morrhuana	1	1	0	2	0.7	0.6	0.5	0- 2.2	3	4.4	82.1
5. Yoldia limatula	2	0	0	2	0.7	1.2	1.9	0- 3.7	3	4.4	86.5
6. Thuiaria sp.	0	1	0	1	0.3	0.6	1.1	0- 1.8	4	2.2	88.7
7. Cerianthus sp.	0	1	0	1	0.3	0.6	1.1	0- 1.8	4	2.2	90.9
8. Cerebratulus sp.	0	1	0	1	0.3	0.6	1.1	0- 1.8	4	2.2	93.1
9. Multinia lateralis	1	0	0	1	0.3	0.6	1.1	0- 1.8	4	2.2	95.3
10. Lumbrineris fragilis	1	0	0	1	0.3	0.6	1.1	0- 1.8	4	2.2	97.5
11. Pectinaria (gouldii)	0	1	0	1	0.3	0.6	1.1	0- 1.8	4	2.2	99.7

TOTAL	17	20	8	45	15.0	6.2	2.6	0-30.4			
TOTAL # OF SPP PER DREDGE	6	7	2	11	5.0	2.6		0-11.6			
SPECIES DIVERSITY (H')	1.49	1.15	0.38	3.02	1.01						
EQUITABILITY (J')	0.83	0.59	0.54	1.96	0.65						

TOTAL # OF INDIVIDUALS THIS STATION = 45

TABLE I-8

## DAMOS BENTHOS - TABLE OF NUMERIC DENSITY DATA

CAR &amp; WLIS REFERENCE STATION - 12 APRIL 1978

PREDOMINANT SPECIES	DREDGE NUMBER			TOTAL MEAN	STANDARD DEVIATION	COEFF. OF DISPERSION	95 PERCENT CONF. LIMITS OF MEAN	NUMERIC RANK	% OF TOTAL	CUMUL. % OF TOTAL
	#1	#2	#3							
1. <i>Nephythys incisa</i>	26	10	20	56	18.7	8.1	0-38.8	1	70.9	70.9
2. <i>Euclymene collaris</i>	1	3	0	4	1.3	1.5	0-5.0	2	5.1	76.0
3. <i>Nassarius tribittatus</i>	0	0	3	3	1.0	1.7	0-5.2	3	3.8	79.8
4. <i>Macoma</i> sp.	0	0	3	3	1.0	1.7	0-5.2	3	3.8	83.6
5. <i>Pherusa affinia</i>	0	1	2	3	1.0	1.0	0-3.5	3	3.8	87.4
6. <i>Cerianthus</i> sp.	0	2	0	2	0.7	1.2	0-3.7	4	2.5	89.9
7. <i>Clymenella zonalis</i>	0	1	1	2	0.7	0.6	0-2.2	4	2.5	92.4

TOTAL	27	17	29	73	24.3	6.4	8.4-40.2	1.7	8.4-40.2	
TOTAL # OF SPP PER DREDGE	5	6	7	13	6.0	1.0	3.5-8.5			
SPECIES DIVERSITY (H')	0.58	1.35	1.24	3.17	1.06	0.42				
EQUITABILITY (J')	0.36	0.75	0.64	1.75	0.58	0.20				

TOTAL # OF INDIVIDUALS THIS STATION = 79

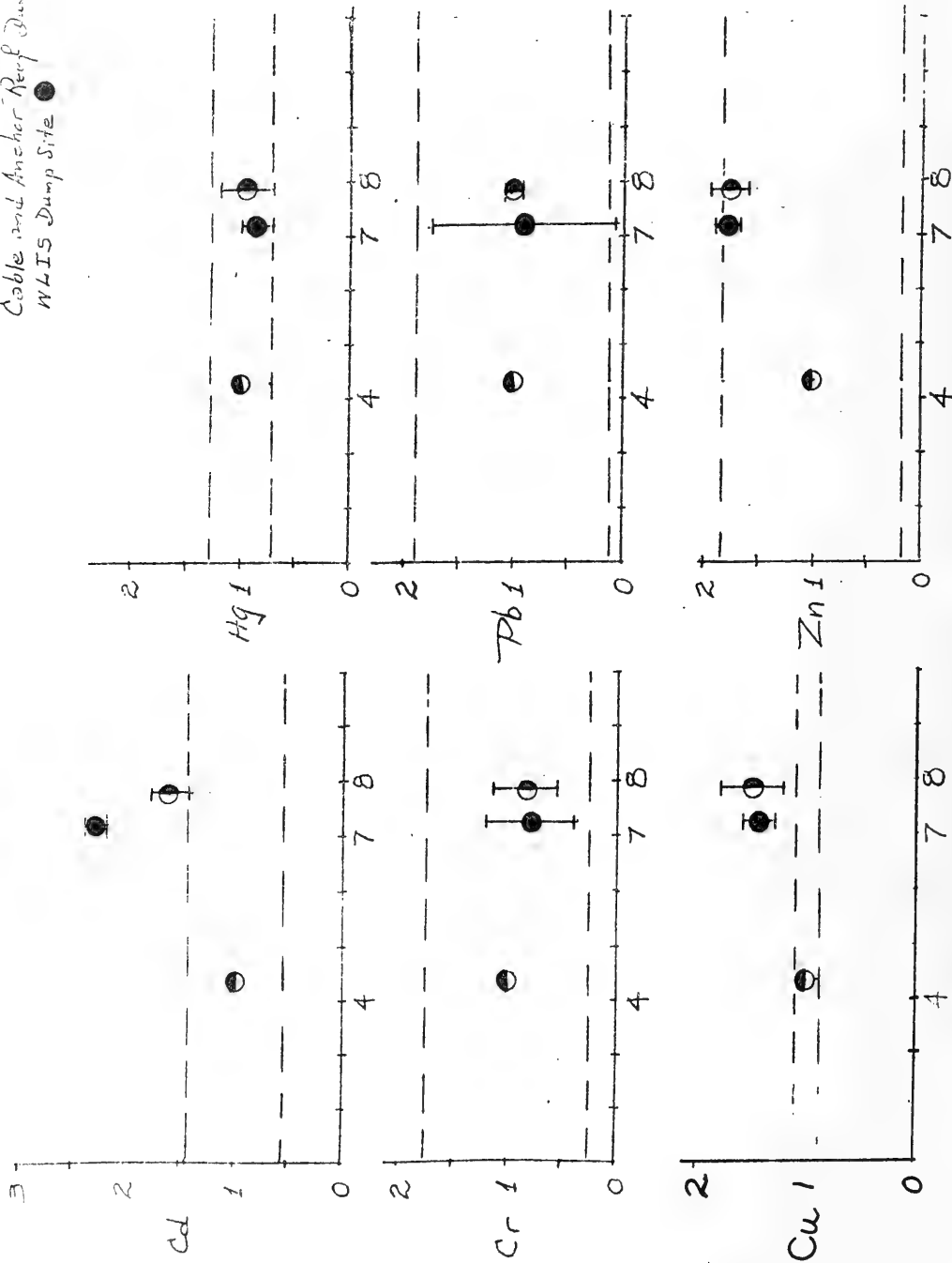
TABLE I-9

## LOBSTER CATCH DATA FOR 1977

Conn. Dept. Environmental Protection, Logbook Statistics

% of N. Y. and Conn. Catch From Areas Within L. I. S.	% of N. Y. and Conn. Catch Landed At Larger Conn. Ports
Western Sound	Greenwich 2.3
Conn. 40.81 N. Y. 3.59	Stanford 6.4
	Darien 4.7
	Norwalk 7.1
	Westport 1.3
	Fairfield 0.7
	Bridgeport 10.6
	Stratford 0.2
Central Sound	Milford 1.3
Conn. 18.61 N. Y. 0.55	West Haven 0.1
	New Haven 8.3
	East Haven 0.1
	Bramford 3.6
	Gilford 0.7
	Madison 0.3
	Clinton 2.6
	Westbrook 1.7
	Saybrook 0.5
Eastern Sound	Old Lyne 0.2
Conn. 8.15 N. Y. 21.77	Waterford 0.7
	New London 0.6
	Groton 16.0
	Noank 1.1
	Stonington 6.5

Cable and Anchor Reef Dump Site  
 WLIS Dump Site



Temporal variation in the ratios of heavy metals in *Mytilus edulis* from Latimer's Light (○) and Cable and Anchor Reef (●) disposal site.

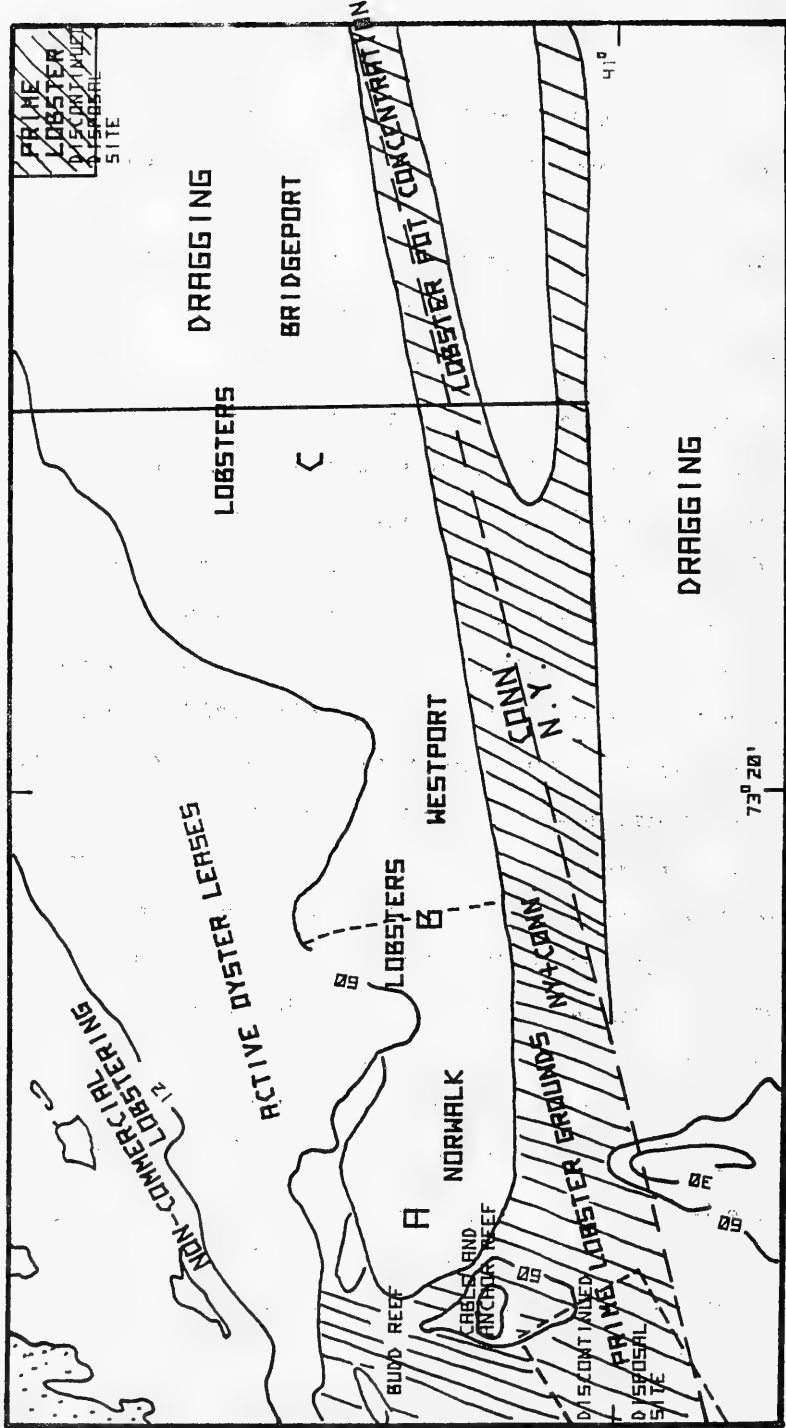
This report is based on field observations in August, 1978 and interviews with 4 lobstermen and should be considered as a "first pass" to be expanded and corrected.

In September, 1978 the Connecticut Commercial Fisherman's Association was formed. It is hoped that the existence of this group will help in assembling information on the fisheries of the Western Sound.

Fisheries. Lobstering is the dominant fishery in the area under consideration. Table H-9 shows that in 1977 41.8% of the lobsters caught in the Sound came from a relatively small area of western Connecticut (Fig. I-11). The adjacent NY area yielded only 3.6% of the catch. Although there are large lobster landings at Northport N.Y., most of this catch is also from Connecticut waters.

The following annual pattern of fishing was described by Norwalk lobstermen: In March, fishing begins in the area between the 20 meter line and Cable and Anchor Reef. During late spring and early summer the gear is spread to the limit of Norwalk grounds east and west, between 2 meters and the N.Y. line. Pots are relatively heavy at the Eatons Neck dump site, Cable and Anchor Reef, Budd Reef, and along the 20 meter line. Gear may be placed in the deep channel east of the dump site in August. N.Y. fishermen may fish this channel from spring on, however.

Cobb et al (1978) mapped lobstering grounds near the Eatons Neck dump site from observations made from November to June, 1974-75. Heavy pot densities were found in the disposal ground in the summer. In the winter there were fewer pots, but these were found east of Cable and Anchor Reef. Travel samples taken by Cobb et al showed a similar movement in lobster densities in the valley east of the dump site which were seen in August, 1978. This map can be interpreted as showing the pattern of the New York-based fishery and the absence of near shore populations off New York in the winter.



FISHERIES IN WESTERN LONG ISLAND SOUND

Penfield Reef dumping ground in the northeast corner of the map, has been a prime lobstering ground since its use was discontinued. A fisherman who fishes the area extensively reported that he lost gear during the last disposal project there and that catches were low in the area until the year following its use.

Details of lobstering effort have not yet been obtained for areas east of the area fished by Norwalk vessels. Concentration of gear on the edges of the central valley of the Sound has been reported. There may be advantages to a disposal site in areas "B" or "C" (Fig. I-11). The very productive grounds at the Eatons Neck dump site and the deep channel are avoided and the greater area fished would allow adjustments to be made away from the site when active. The current measurements and background measurements of metals "in" blue mussels being made in area "A" by DAMOS should be applicable to the general area.

Finfish. Cobb et al (1978) also collected bottom fish at three stations monthly from November to June. They found 37 species, but 3 species dominated the catches. Windowpane flounder and winter flounder were found throughout the year, but were most abundant in April and January respectively. Red hake were abundant in June especially east of the disposal site.

Commercial dragging is limited by the density of lobster pots in this area. There is a tow path from the Eatons Neck dump site 5 miles west to Buoy "32". Dragging is done in New York water south of 41° latitude and east of a line about 7 miles east of Cable and Anchor Reef.

The fall scup fishery is the most intense. There may be fish on or off the bottom depending on the level of the fish. Bottom fishing may also catch lobsters.

Oysters. The areas being studied lie seaward of hard bottomed areas used for oyster mariculture. Leases as deep as 40-50 feet are active (H, Bloom, Norwalk). Oyster set was very successful throughout Long Island Sound in 1978.

Ocean Quahog. The ocean quahog (*Arctica Islandica*) can be found in this area but there is no chance that it will be of commercial value in the study site due to the depth and nearly rocky bottoms. Much more favorable grounds are found off Massachusetts and Rhode Island (20-40 meters deep). These areas can easily saturate the market and the fishery has been barely economically viable in the last year.





