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CRUISE REPORT BLM-M-5  
R/V OCEANUS: 21 July - 28 July 1982 (CONS 124)  
FOR  
GEORGES BANK  
BENTHIC INFAUNA MONITORING PROGRAM

Performed for

UNITED STATES DEPARTMENT OF THE INTERIOR  
MINERALS MANAGEMENT SERVICE  
Washington, D.C. 20240

Under Contract No. AA851-CT2-7

August 11, 1982

by

BATTELLE  
New England Marine Research Laboratory  
397 Washington Street  
Duxbury, Massachusetts 02332

and

WOODS HOLE OCEANOGRAPHIC INSTITUTION  
Woods Hole, MA 02543

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Objective:

Cruise BLM M-5 was the fifth in the series of seasonal benthic sampling cruises performed as part of the Georges Bank Lease Sale No. 42 environmental monitoring program. The major emphasis of the program is to determine the extent of deposition and accumulation of potentially toxic materials as a result of oil drilling activities and any subsequent effects on the benthic biota. Sediment samples were collected for analysis of benthic infauna and epifauna, trace metal and hydrocarbon analysis, CHN and sediment grain-size analyses; and camera stations were occupied to record microtopography and visible macrofauna.

Sampling Program:

The sampling plan is based on recommendations by the Biological Task Force, the U.S. Geological Survey, and the Minerals Management Service. Nine regional stations were established to include cross-shelf transects upcurrent of the lease sale tracts, through the lease tracts, and downstream of the drilling sites. Additional stations are located at the head of Lydonia Canyon (Sta. 7A),

at the shelf/slope break (Sta. 8), the head of Oceanographer Canyon (Sta. 9), in the Gulf of Maine (Sta. 14A) and in the shallow part of the Bank (Sta. 15). Stations 7 and 14, which were sampled on previous cruises, were relocated and designated as Stations 7A and 14A. An additional 3 stations are located at Block 410, where drilling commenced July, 1981. Station 13 is located in the "mudpatch", an area of potential deposition; however, preliminary results of sediment analyses showed that the sediments at Station 13 were not as fine as expected. A new regional station, designated 13A, was therefore established during Cruise M-4. This station is located west of the original Station 13 and was again sampled during M-5.

A site-specific array of 29 stations around an exploratory rig in Block 312 is sampled in order to examine on a fine scale the effects of discharges from a single drilling rig. Nineteen stations are designated "primary" and 10 are "secondary". Site-specific Station 5-1 is also a regional station.

Samples collected during Cruise BLM M-5 (summer), in conjunction with those collected during Cruises M-1 (summer), M-2 (autumn), M-3 (winter) and M-4 (spring) will provide seasonal data on the spatial and temporal variation in in-faunal benthic communities and associated sediments across a broad area of the Bank, as well as in the closely spaced site-specific array.

#### Cruise Report:

BLM M-5, aboard WHOI's R/V Oceanus, departed Woods Hole at 10:00 on July 21, 1982 and returned at 23:30 July 28, 1982. Excellent weather conditions allowed work to be completed at all stations without interruptions. The cruise track for M-5 is shown on Figure 1. Average LORAN C positions for site-specific stations are shown on Figure 2-A. The majority of samples collected were 0.1m<sup>2</sup> and 0.04m<sup>2</sup> Van Veen grab samples for biological and/or chemical analyses. At each regional station six 0.04m<sup>2</sup> biology grab samples and three 0.1m<sup>2</sup> geology/chemistry grab samples were taken.

Dredge and trawl sampling was carried out using a Rocking Chair Dredge for Arctica islandica, and a Yankee 36 trawl was used for collecting fish. Also, surface and bottom water samples for salinity, bottom water samples for dissolved oxygen and XBT casts were made at all regional stations. A malfunction of the shipboard XBT plotter prevented an XBT reading at Station 5-1. Therefore, surface and bottom temperatures were recorded from water bottle samples taken at Stations 5-1, and an extra XBT cast was made at Station 5-6 for temperature data.

### Navigation:

LORAN Northstar 6000 was used for navigation. Average time delays from BLM M-1 were used for station location (Tables 1 and 2), except for the newly established stations 13A, 14A, and 7A. Both the ship's LORAN and the MMS LORAN unit broke down at sea. A back-up Northstar 6000 was aboard and put to use. Change of LORAN units occurred between Station 5R and 4R.

### Grab Samples:

All of the 0.04m<sup>2</sup> biology grab samples and chemistry grab samples were successfully obtained.

The 0.04m<sup>2</sup> biology grabs were subsampled for CHN and grain size samples; the remainder of the sample was then partially sieved prior to adding buffered formalin as a fixative. The CHN and grain size subsamples were labelled and frozen. Chemistry samples were labelled and frozen. When large Arctica were present in the chemistry grabs, these were removed and frozen for tissue analysis. Several extra chemistry grabs were collected at the request of the MMS chemists. Extra subsurface sediment from one chemistry grab at each regional station was stored in a plastic bag. Also, one extra chemistry grab was taken for the University of Maine at Station 13A.

### Camera:

A Benthos <sup>®</sup> Model 372 and strobe unit triggered by a bottom contact switch was used for the camera work. Bottom photographs were taken at all regional and primary site-specific stations. Test strips of film were immediately developed in order to monitor the function of the camera. Initial test strips developed after the first two stations were very dark and hard to read. Therefore, the camera lens opening was reset to a wider aperture. Subsequent test strips then revealed better exposure.

### Dredge Samples:

Dredge sampling was carried out using a Rocking Chair Dredge at all required stations except Station 5-1 because salvage operations by another vessel for a lost oil rig sea anchor prevented dredging at that station. Therefore, an alternate site near Station 5-3 was used for dredge sampling. Other required samplings with the dredge were carried out at Stations 2R, between 10R and 11R, between 5-22 and 5-28, and between 5-18 and 5-25. These samplings failed to capture animals for chemistry except near Stations 5-18 and 10R. Further dredge sampling was then carried out at alternate Stations 4R and 5-15 which resulted in successful samplings. Figure 3 shows the successful dredge sampling tracks for the site-specific sampling.

### Otter Trawls:

Otter trawls were made with a Yankee 36 trawl at Stations 2R, 13R, and between Stations 5-14 and 5-22 in a north/south direction. Fish taken in the trawl for chemistry were the fourspot flounder Paralichthys oblongus and the witch flounder Glyptocephalus cynoglossus. Trawl duration was generally about 30 minutes on the bottom. Other animals collected in the trawl were butterfish, hakes, sharks, and starfish. One fish of each species per trawl was returned to Battelle for archiving.

### Participating Scientific Personnel:

W.H.O.I.: George Hampson, Chief Scientist  
Rosemarie Petrecca  
Steve Page

BATTELLE: Connie Delano  
Nina Vassalotti  
Bill Johnson  
Paul Perra

MMS: Donald McElroy  
Rick Rendigs  
Paul Bokar

S.A.I.: Robin Robinson  
Rusty Sims

SUMMARY OF SAMPLES COLLECTED

<u>Sample Type</u>	<u>Sample Designation</u>	<u>Total Number Collected</u>	<u>Comments</u>
0.1m <sup>2</sup> Chem	G-I, extras	141+	Extras collected
0.04m <sup>2</sup> Bio	J-P	276	No "0" Designation
CHN	Sta/grab	276	Subsample from 0.04m <sup>2</sup> Bio grabs
Grain Size	Sta/grab	276	
D.O.	Sta. No.	19	Regional Stations only, bottom.
Salinity	Sta. No.	38	Regional Stations only, surface & bottom
XBT	Sta. No.	19	Regional Stations only
Camera	Sta. No.	37	20 Frames/Station
Dredge	Sta. No.	6	
Otter Trawl	Sta. No.	3	30 Minute Bottom Tows

Sample Locations:

All biological samples, CHN, plus D.O., and XBT data and test strip film at Battelle, Duxbury; sediment grain size samples, salinity and un-processed film footage at W.H.O.I.; chemistry samples at MMS, Woods Hole (trace metal samples) and S.A.I., La Jolla, CA (hydrocarbon samples) stored at MMS, Woods Hole.

TABLE 1. REGIONAL STATIONS. CRUISE BLM H-5 (R/V OCEANUS)

Sta. No.	Date and Time (GMT)	BIF Position	BLM M-1 Ave. T.D.	Closest M-5 LORAN-C Lat./Long.	H-5 Ave. T.D.	Depth (M)	0.1m CHEM	0.04m BIO	XBT	Camera	Dredge	Comments
14 AR	21-22 July 1982 2626 - 0613	41°57.5'N* 68°31.0'W	-----	41°57.5'N 68°31.1'W	13299.3 43931.3	165	3	6	1	Yes	No	
15 R	22 July 1982 1107 - 1233	41°27.5'N 68°00.7'W	13402.0 43735.2	41°27.4'N 68°00.6'W	13302.4 43735.3	42	3	0	1	Yes	No	
1 R	22 July 1982 1659 - 1937	41°13.0'N 67°15.3'W	13172.3 43615.2	41°12.5'N 67°14.5'W	13172.0 43615.2	53	3	6	1	Yes	No	
2 R	22-23 July 1982 2144 - 0342	40°59.0'N 66°55.8'W	13156.5 43532.0	40°59.2'N 66°55.8'W	13156.2 43532.0	66	3	6	1	Yes	Yes	-otter trawl
3 R	23 July 1982 0523 - 0736	40°53.7'N 66°46.5'W	13144.2 43496.7	40°53.7'N 66°46.5'W	13144.1 43496.7	93	3	6	1	Yes	No	
17 R	23 July 1982 1043 - 1304	40°35.0'N 67°11.7'W	13320.5 43409.5	40°35.0'N 67°11.2'W	13320.5 43409.5	135	3	6	1	Yes	No	-10 grab casts
16 R	23 July 1982 1401 - 1625	40°34.2'N 67°12.3'W	13328.3 43406.8	40°34.3'N 67°12.4'W	13328.2 43406.8	133	3	6	1	Yes	No	-11 grab casts
18 R	23 July 1982 1509 - 1904	40°33.5'N 67°13.7'W	13335.8 43402.6	40°33.5'N 67°13.5'W	13335.7 43402.6	140	3	6	1	Yes	No	
8 R	23-24 July 1982 2155 - 0022	40°27.1'N 67°37.4'W	13459.8 43379.1	40°27.1'N 67°37.1'W	13459.8 43379.9	140	3	6	1	Yes	No	
7 AR	24 July 1982 0209 - 0440	40°32.2'N* 67°44.2'W	-----	40°32.2'N 67°44.2'W	13470.3 43411.5	160	3	6	1	Yes	No	-10 grab casts
6 R	24 July 1982 0547 - 0720	40°34.3'N 67°45.3'W	13465.9 43425.5	40°34.4'N 67°45.3'W	13466.7 43425.5	92	3	6	1	Yes	No	
4 R	27 July 1982 1333 - 1615	40°50.7'N 68°00.2'W	13464.5 43529.2	40°50.7'N 68°00.4'W	13464.5 43529.1	60	3	6	1	Yes	Yes	-11 grab casts, clams in Jaws. -RCD, 9 Arctica.
9 R	27 July 1982 1816 - 2017	40°26.7'N 68°09.8'W	13604.1 43394.2	40°26.7'N 68°09.9'W	13603.9 43394.3	137	3	6	1	Yes	No	
12 R	27 July 1982 2156 - 2303	40°22.2'N 68°30.2'W	13712.9 43378.0	40°22.2'N 68°30.1'W	13712.9 43378.0	93	3	6	1	Yes	No	
11 R	28 July 1982 0037 - 0241	40°30.8'N 68°33.7'W	13698.0 43433.5	40°30.8'N 68°33.7'W	13699.0 43433.4	77	3	6	1	Yes	Yes	-10 grab casts, clam shells 2 Arcticas -RCD to 10R, 10 clams.
10 R	28 July 1982 0018 - 0223	40°42.0'N 68°35.3'W	13661.8 43502.7	40°42.0'N 68°35.3'W	13661.7 43502.7	56	3	6	1	Yes	No	
13 R	28 July 1982 1418 - 1830	40°29.5'N 70°12.6'W	14201.9 43496.1	40°29.3'N 70°12.6'W	14201.7 43496.1	62	3	6	1	Yes	No	-2 otter trawls, flounder for chemistry.
13 AR	28 July 1982 2152 - 2253	40°30.0'N** 71°00.5'W	-----	40°30.0'N 71°00.5'W	14464.0 43541.3	74	4	6	1	Yes	No	-extra chem. -Univ. of Maine

\*=changed on Cruise H-5  
\*\*=Added on Cruise H-5  
RCD=Rocking Chair Dredge

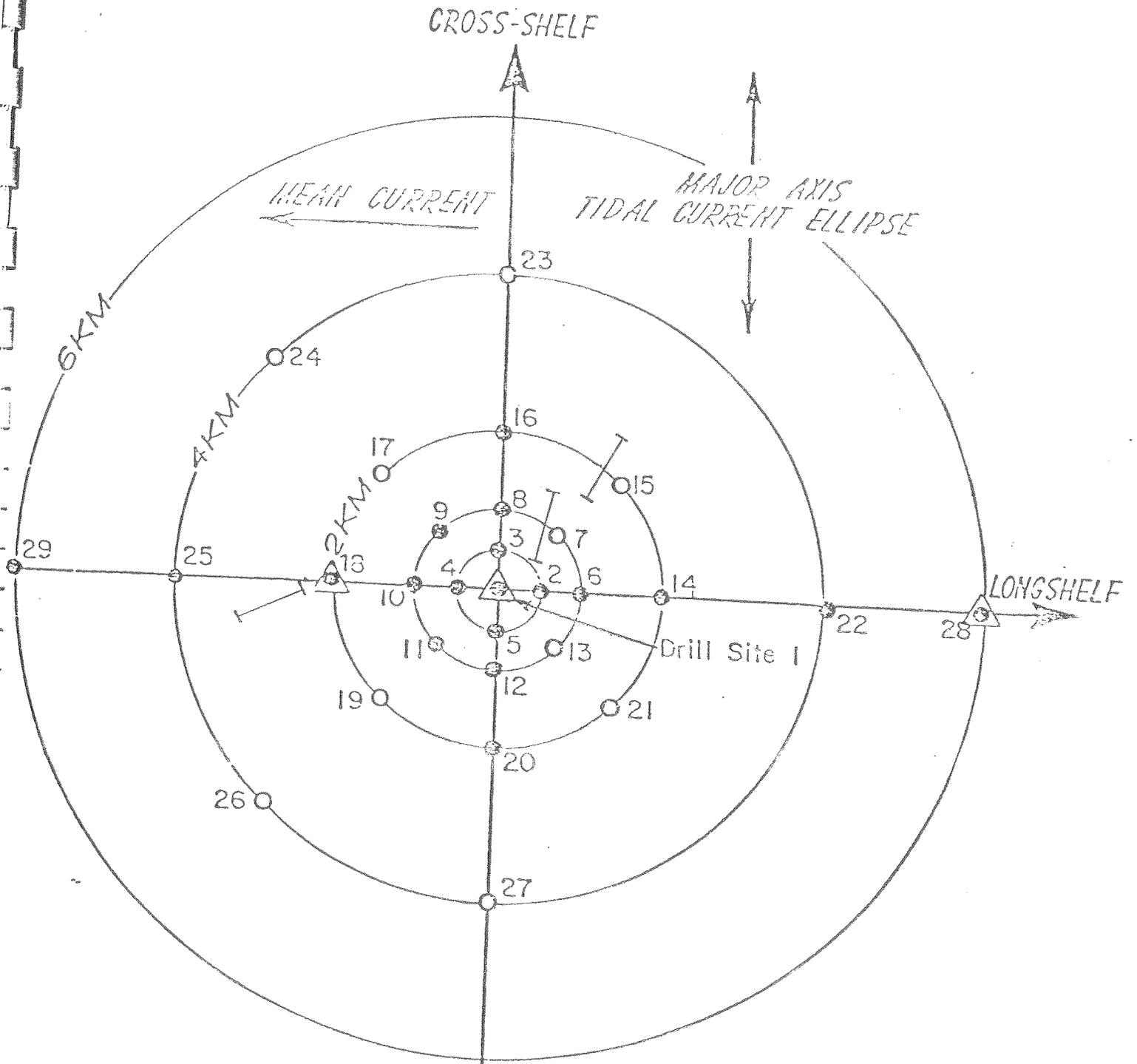
TABLE 2. SITE-SPECIFIC STATIONS. CRUISE BLM M-5 (R/V OCEANUS)

Sta. No.	Date and Time (GMT)	BIF Position	BLM M-1 Ave. I.D.	Closest M-5 LORAN-C Lat./Long.	M-5 Ave. I.D.	Depth (M)	0.1m CHEM	0.4m BIO	Camera	Dredge	Comments
5-6	24 July 1982 0912 - 1042	40°39.5'N 67°45.4'W	13444.7 43454.6	40°39.5'N 67°45.2'W	13444.6 43454.4	75	3	6	Yes	No	-1 Arctica taken for chemistry -XBT cast
5-8	24 July 1982 1226 - 1415	40°40.1'N 67°46.1'W	13445.3 43458.3	40°40.1'N 67°46.0'W	13445.4 43458.2	73	3	6	Yes	No	
5-9	24 July 1982 1503 - 1621	40°39.9'N 67°46.7'W	13448.6 43457.7	40°39.9'N 67°46.5'W	13448.5 43457.6	74	3	6	Yes	No	
5-10	24 July 1982 1639 - 1743	40°39.4'N 67°46.9'W	13451.4 43455.4	40°39.5'N 67°46.7'W	13451.2 43455.4	75	3	6	Yes	No	
5-11	24 July 1982 1807 - 1917	40°39.2'N 67°46.6'W	13451.3 43453.4	40°39.2'N 67°46.4'W	13451.1 43453.4	75	3	6	Yes	No	
5-12	24 July 1982 1944 - 2101	40°39.0'N 67°46.1'W	13449.7 43452.2	40°39.0'N 67°45.9'W	13449.7 43452.0	75	3	6	Yes	No	
5-14	24-25 July 1982 2231 - 0006	40°39.5'N 67°44.7'W	13441.6 43454.2	40°39.5'N 67°44.5'W	13441.7 43454.1	73	3	6	Yes	No	-extra Bio. for USGS
5-16	25 July 1982 0219 - 0329	40°40.6'N 67°46.1'W	13443.3 43461.1	40°40.6'N 67°45.9'W	13443.4 43461.0	73	3	6	Yes	No	-3 RCD 19 Arctica
5-18	25 July 1982 0528 - 0651	40°39.5'N 67°47.6'W	13453.8 43456.2	40°39.6'N 67°47.3'W	13453.6 43456.2	75	3	6	Yes	Yes	
5-20	25 July 1982 0837 - 1001	40°38.5'N 67°46.1'W	13452.0 43448.4	40°38.4'N 67°45.8'W	13451.9 43448.3	71	3	6	Yes	No	-1 Arctica taken for chemistry
5-22	25 July 1982 1230 - 1351	40°39.5'N 67°43.3'W	13435.9 43453.5	40°39.5'N 67°43.2'W	13436.1 43453.4	73	3	6	Yes	No	-2 otter trawls, flounder for chemistry
5-28	25 July 1982 1820 - 2100	40°39.5'N 67°41.7'W	13429.6 43452.4	40°39.5'N 67°41.7'W	13429.6 43452.3	71	3	6	Yes	Yes	-1 Arctica taken for chemistry -RCD H to S, 1/2 way between 5-22 & 5-28, no Arctica
5-25	26 July 1982 0612 - 0740	40°39.5'N 67°49.0'W	13459.7 43457.1	40°39.6'N 67°48.7'W	13459.4 43457.3	76	3	6	Yes	No	-strong currents, hard to get full grabs
5-29	26 July 1982 0809 - 0930	40°39.5'N 67°50.4'W	13465.5 43459.1	40°39.7'N 67°50.4'W	13466.4 43459.1	78	3	6	Yes	No	
5-4	26 July 1982 1435-1612	40°39.5'N 67°46.5'W	13449.3 43455.3	40°39.5'N 67°46.3'W	13449.4 43455.3	75	3	6	Yes	No	
5-2	26 July 1982 1641 - 1755	40°39.6'N 67°45.9'W	13446.0 43455.2	40°39.6'N 67°45.6'W	13446.0 43455.2	75	3	6	Yes	No	
5-3	26 July 1982 1809 - 1924	40°39.8'N 67°46.1'W	13446.4 43456.9	40°39.8'N 67°45.9'W	13446.2 43456.9	75	3	6	Yes	No	-2 RCD's, to NE, 7 Arctica taken -3 Arctica taken for chemistry -1 grab casts/shells
5-1	26 July 1982 1942 - 2053	40°39.5'N 67°46.2'W	13447.8 43454.9	40°39.5'N 67°45.9'W	13447.7 43454.7	75	3	6	Yes	No	-0-111 cuttings in samples -4 XBT attempts/used H <sub>2</sub> O bottle for temp.
5-5	26 July 1982 2128 - 2245	40°39.3'N 67°46.2'W	13448.8 43453.6	40°39.3'N 67°45.9'W	13448.7 43453.5	75	3	6	Yes	No	-high pop. of Amphipods

TABLE 2. SITE-SPECIFIC STATIONS. CRUISE BLM M-5 (R/V OCEANUS) (Continued)

Sta. No.	Date and Time (GMT)	BIF Position	BLM M-1		Closest M-5		M-5 Ave. T.D.	Depth (M)	0.1m CHEM	0.4m BIO	Camera	Dredge	Comments
			Ave. T.D.	Long.	Ave. T.D.	Lat./Long.							
5-7	24 July 1982 1059 - 1210	40°39.9'N 67°45.7'W	13443.9 43457.1		40°39.9'N 67°45.5'W		13444.0 43456.8	73	3	6	No	No	
5-13	24 July 1982 2117 - 2201	40°39.2'N 67°45.6'W	13447.1 43452.7		40°39.2'N 67°45.4'W		13447.2 43452.6	71	3	6	No	No	
5-15	25 July 1982 0029 - 0154	40°40.3'N 67°45.2'W	13440.3 43458.8		40°40.3'N 67°45.0'W		13440.6 43458.7	72	3	6	No	Yes	-11 grab casts, 1 Arctica in Bio. grab
5-17	25 July 1982 0347 - 0454	40°40.3'N 67°47.1'W	13448.3 43460.0		40°40.3'N 67°46.7'W		13448.2 43460.0	74	3	6	No	No	-10 grab casts
5-19	25 July 1982 0726 - 0813	40°38.8'N 67°47.2'W	13455.2 43451.4		40°38.8'N 67°46.9'W		13455.2 43451.3	76	3	6	No	No	-1 Arctica (in bio. grab)
5-21	25 July 1982 1035 - 1139	40°38.8'N 67°45.1'W	13446.3 43450.3		40°38.8'N 67°44.9'W		13446.3 43450.1	70	3	6	No	No	
5-23	25 July 1982 1432 - 1540	40°41.7'N 67°46.1'W	13438.8 43467.5		40°41.7'N 67°45.9'W		13438.8 43467.4	73	3	6	No	No	
5-24	25 July 1982 1606 - 1709	40°41.1'N 67°42.1'W	13449.9 43465.3		40°41.1'N 67°47.9'W		13449.9 43465.3	75	3	6	No	No	-11 grab casts
5-26	26 July 1982 1015 - 1126	40°38.0'N 67°48.1'W	13462.5 43447.7		40°38.0'N 67°47.9'W		13462.4 43447.4	76	3	6	No	No	-fog, Loran jumping 4 u to S. -10 grab casts
5-27	26 July 1982 1153 - 1315	40°37.4'N 67°46.1'W	13456.4 43442.8		40°37.4'N 67°46.0'W		13456.4 43442.5	75	3	6	No	No	-1 Arctica in Bio. grab -11 grab casts; Bio grab

Figure 3 . Site-Specific Stations with successful Dredge Tracks



- Primary Stations
- Secondary Stations
- △ Special Stations
- ┌─┐ Dredge Track

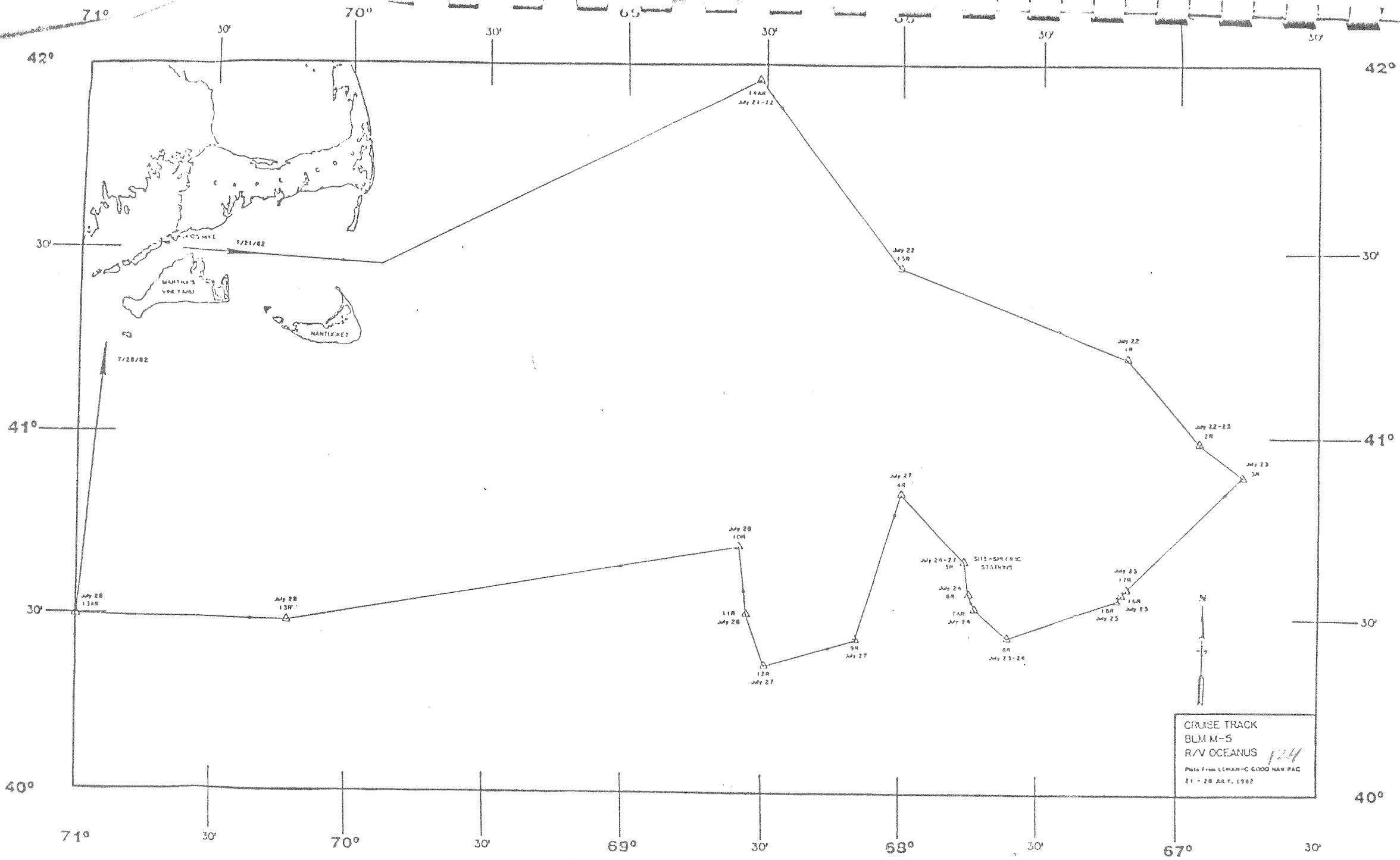


Figure 1.

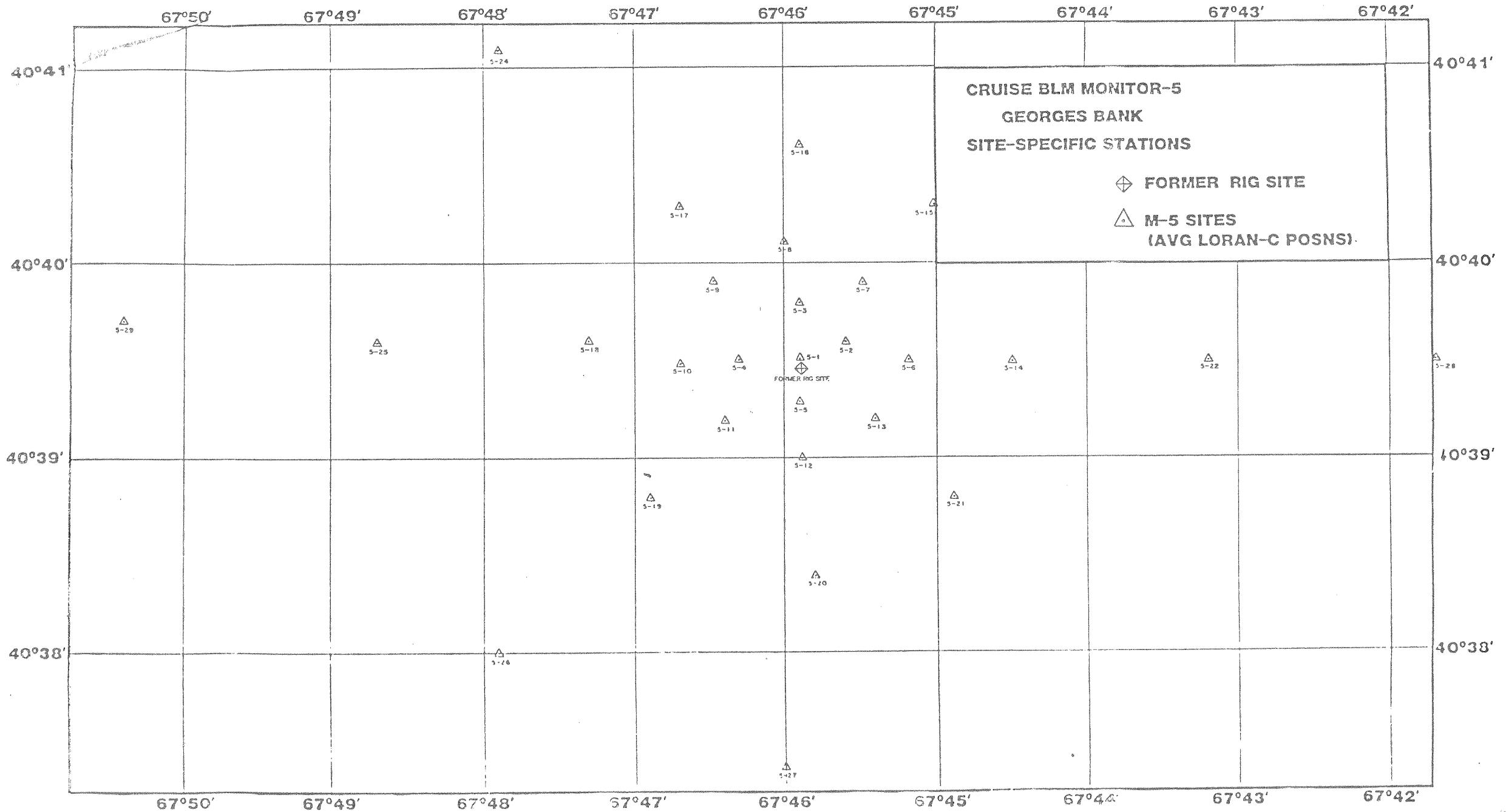


Figure 2 .