UNITED STATES

DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Notes on the acquisition of high-resolution seismic reflection profiles, side-scanning sonar records, and sediment samples from lower Cook Inlet and Kodiak Shelf, R/V SEA SOUNDER cruise S8-79-WG July-August, 1979.

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INTRODUCTION

The fourth U.S. Geological Survey geo-environmental cruise in lower Cook Inlet and on Kodiak Shelf and adjacent continental slope, Gulf of Alaska, was conducted aboard the R/V SEA SOUNDER from 29 July to 15 August, 1979 (Fig. 1). The objectives of the cruise were to study in detail specific potentially hazardous geologic conditions identified as a result of the first reconnaissance cruise conducted in June and July of 1976 and from work by other investigators, and to expand the regional coverage on Kodiak Shelf. Seismic reflection profiling (sparker, Uniboom*, 3.5 kHz, 12 kHz) and side-scanning sonar surveys formed the basis for selecting stations for observation with bottom television and 70 mm bottom camera as well as for sampling of surficial sediment (gravity corer, vibracorer, grab sampler).

Generalized trackline charts are given in Figures 2 and 3. Detailed shot-point charts could not be constructed clearly, because of the overlap and coincidence of many of the lines. Station locations are shown in Figure 4 and 5, and sampling information is given in Table 4. Table 5 contains the navigation records from the cruise.

The results of our investigations to date can be found in the references listed at the end of this text. Background information in lower Cook Inlet with several references is given in Open-File Report 75-429 (Magoon and others, 1979), and on Kodiak Shelf in Open-File Report 76-325 (von Huene and others, 1976).

In addition, this report accompanies the basic seismic-reflection and side-scanning sonar records acquired on the cruise. The seismic-reflection records are publicly available from the National Geophysical and Solar Terrestrial Data Center EDS/NOAA, Boulder, Colorado 80302. These records can be inspected at U.S. Geological Survey offices at Rm B-164, Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California 94303.

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INSTRUMENTATION AND PROCEDURES

Navigation

Navigational systems used by the scientific party consisted of integrated Magnavox satellite-Loran C and Motorola Mini-Ranger units. (Mini-Ranger was used only in lower Cook Inlet.) The data from the integrated systems were automatically recorded on magnetic tape, as well as typed out on a keyboard printer.

Every 15 minutes the positions were plotted manually on a 1:250,000 scale chart in lower Cook Inlet and on a 1:500,000 scale chart on Kodiak Shelf. For easy reference a shot-point number was given to each 15-minute position. In addition to the routine plots, the locations of course changes were plotted. Furthermore, dead-reckoning positions based on satellite data, the ship's single-axis speed log and the gyro, were computed every two seconds by the integrated system and stored on magnetic tape.

The Mini-Ranger system recived its return signals from shore-based transponders positioned at strategic locations by a land-based support group. A maximum line-of-sight range over 80 nautical miles was obtained for some transponder locations. The Mini-Ranger was used as the primary navigational system in lower Cook Inlet because of the high frequency and accuracy of the data and because most tracklines were within range limits of the system.

In addition to the navigation by the scientific party, the ship's officers frequently succeeded in using radar and obtaining line-of-sight bearings. Correspondence between the ship's and scientific positions generally was good.

Seismic Profiling and Visual Format Systems

Sparker: Sparker data were recorded on Kodiak Shelf using a Teledyne system at a power of 10 to 20 kilojoules. Seismic signals were received on a Teledyne 100-element, single-channel hydrophone, and the reocrd was printed on a Raytheon model UGR1900 Precision Recorder. Sweep firing rates were 2 seconds. Filters were adjusted to receive signals between 40 and 125 hertz. Records were annotated at $\frac{1}{2}$ -hour intervals with shot-point number, time (Greenwich Mean Time, GMT), and water depth.

Uniboom: The Uniboom system used four EG&E model 234 power sources of 200 joules each driving hull-mounted plates. The hydrophone was an EG&E model 265. Data were recorded on an EPC 4100 recorder. Sweep and firing rates were typically at one-half second, and filter settings at about 600 to 1700 hertz. Annotations were made in the same manner as those on the sparker system, except at 15-minute intervals.

High-resolution: A Ratheon TR-109 3.5 kilohertz seismic system, with a Raytheon 105 PTR transceiver and a CESP-II correlator, was used to gather high-resolution shallow-penetration seismic data as well as bathymetry. The system operated with 12 hull-mounted transducers, and the data were recorded on an EPC 4100 recorder. Sweep and firing rates were at one-half second.

Annotations were made in the same manner as those on the Uniboom system.
Bathymetry: A Raytheon TR-73A transducer and a Raytheon 105 PTR transceiver 12 kilohertz system was used to gather bathymetric data, which were displayed on a digital readout and recorded on magnetic tape. Sweep and firing rates typically were at 1/2 second, and annotations were made the same as for the other acoustic systems.
Record quality: Four factors that significantly affected quality of the seismic records were: 1) the typically coarse-grained and hard nature of the unconsolidated surficial sediment, 2) the shallow water depth throughout most of both areas, 3) acoustic vibrations from the vessel, and 4) rough seas.

Coarse-grained and hard sediment most severely affected the Uniboom and 3.5 kHz records, causing much of the outgoing energy from these high-frequency systems to be reflected directly from the sea bottom with only a minor amount of energy penetrating through to subbottom reflectors. Some of the uniboom records show subtle, irregular traces of subbottom reflectors, which can be traced and correlated only with difficulty. Many of the 3.5 kHz records show no sign of subbottom reflectors and can be used only as indicators of water depth.

The shallow water depth caused multiple reflections to appear at short time intervals after the initial sea-bottom reflection, partially or totally obscuring signals from deeper reflectors.

Although these four factors each have a deleterious effect on record quality, it was found by varying ship speeds and filter settings that the nature of the bottom sediment was the main reason for the seismic systems to display "poor" subbottom acoustic reflections on the records. Depth of penetration and details in the record consequently varied with type of bottom and water depth. Except for certain parts, the records allow adequate subbottom interpretation of geology.
Side-scanning sonar: The side-scanning sonar unit used was an EG&G digital model, normally operated at a 125 m scale and towed above the bottom at 10% of the scale employed. Data were recorded on magnetic type and printed on a continuous, dry-paper recorder. High quality records were generally obtained. Although most side-scan sonar surveys were run at a ship speed of 4 to 4.5 knots, currents could be responsible for a different speed over the bottom.

Normally the uniboom and 3.5 kHz units were run simultaneously with side-scan sonar for depth control and possible subbottom information.
Bottom television and bottom camera: A Hydro Products bottom television unit, underwater mercury lights, and a 70 mm camera were mounted in a large frame. Photographic exposures could be made by remote control by the TV-screen observer. A multiconductor cable, leading to the camera and light, was taped at 5 m intervals to the winch cable.

Because currents are always present in the lower Cook Inlet area it was impossible to fly the sled slowly and at a uniform distance over the bottom. Consequently a system of jumping had to be used, lowering the sled to the bottom and giving some slack wire. Due to ship's drift, the cables became taut after a few seconds and the sled was then dragged over the bottom. At

that time, it was lifted and allowed to drift rapidly before it was again lowered to the bottom.

Sampling Devices

Gravity corer: The gravity corer consisted of a 1500 pound weight to which one to three 3 m, 7.6 cm ID steel core barrels were attached. A clear polybutyrate liner was inserted in the barrels, and the sediment was retained by a stainless steel core catcher.

The cores were cut into 1.5 m sections, and 10 cm long pieces were cut from the ends of some sections for hydrocarbon gas analysis. The remaining core was x-rayed and then split lengthwise into working and archive halves. From the working half, vane shear measurements were made, and samples were taken for grain size, water content, and Atterberg limits. The archive half was described and photographed. Both sections were put into storage tubes that were capped, taped, labelled, and stored under refrigeration.

Grab samplers: A standard Van Veen grab sampler proved to be too light for adequate sampling of the typically sandy-gravelly seafloor. Generally, successful attempts were obtained with a heavy modified grab sampler constructed by Andy Soutar of Scripps Institution of Oceanography.

Vibracorer: A Kiel vibracorer, capable of collecting 2 m cores, was used in areas of coarse-grained sediment. Two types of barrels were used; one with square cross-section, 10 cm on a side, made of stainless steel, and the other identical to those used for the gravity corer. Generally, the square barrels retrieved longer cores, but they were not collected in plastic liners and were therefore difficult to store.

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Table I. Itinerary of R/V SEA SOUNDER cruise S8-79-WG in lower Cook Inlet and on Kodiak Shelf, Alaska.

Port	Arrive	Depart	Remarks
Homer		29 July - 0700 (210/1700)	Start leg 1, to lower Cook Inlet.
Homer	5 Aug - 1430 (218/0030)		End leg 1.
Homer		6 Aug - 0700 (218/0700)	Start leg 2, to Kodiak Shelf.
Kodiak	15 Aug - 0800 (227/1800)		End leg 2.

NOTE: Julian day and GMT time are given between brackets.

Total underway time: 392 hr.
Total trackline miles/time: 957.8 nm/191.6 hr.
Stations occupied/total time on station: 57/55.7 hr.

Table 2. Types and amounts of data collected on board the R/V SEA SOUNDER cruise S8-79-WG in lower Cook Inlet and on Kodiak Shelf.

Data type	Trackline	Remarks
Single channel arcer	408.5nm (756.5km)	2 rolls recording paper
Uniboom	788.8nm (1460.9km)	13 rolls recording paper
3.5kHz	1302.9nm (2413.0km)	14 rolls recording paper
12kHz	1793.0nm (3320.7km)	11 rolls recording paper
Side-scanning sonar	517.9nm (959.3km)	14 rolls recording paper
Navigation	1862.0nm (3448.6km)	18 reels mag. tape
Gravity core		14 recoveries
Piston core		1 recovery
Vibracore		8 recoveries
Soutar grab		23 recoveries
TV/Camera		6.6 hours, 3 reels mag. tape
Profiling current meter		1 station

Table 3. Scientific personnel on board the R/V SEA SOUNDER cruise S8-79-WG in lower Cook Inlet and on Kodiak Shelf.

Name	Affiliation	Duties	Leg
Arnold Bouma	USGS, PAB*	co-chief scientist	1-2
Monty Hampton	"	co-chief scientist	1-2
Robert Orlando	"	geologist	1-2
Michael Torresan	"	"	1-2
Melvyn Rappeport	"	"	1-2
Michael Underwood	"	"	1-2
Edward Clukey	"	soils engineer	1-2
Phyllis Swenson	"	geologist	1
John Whitney	USGS, Conservation Division, Anchorage	"	1
George Redden	USGS, PAB	"	2
Karen Weliky	"	"	2
Richard Garlow	"	navigator	1-2
Kaye Kinoshita	"	"	1-2
James Nicholson	"	electronics technician	1-2
Ronald Schmitz	"	"	1-2
Jon Ericson	"	mechanical technician	1-2
Robert Wilson	"	"	1-2
Scott Rainsford	"	"	1-2

Ship's Officers

Vernon Pilgrim	captain
Scott Conrad	chief engineer
Paul Bates	chief mate

* USGS, PAB = U.S. Geological Survey, Branch of Pacific-Arctic Marine Geology, Menlo Park, California.

Table 4. Information about sampling stations and samples, cruise S8-79-WG in lower Cook Inlet and on Kodiak Shelf.

Sample number	Latitude Longitude	Water depth (m)	Equipment type	Comments
400	59°36.9'N 152°19.6'W	57	vibracorer	No recovery
401	59°33.0'N 152°07.3'W	39	vibracorer	Shell hash, 36 cm
402	59°34.4'N 152°12.8'W	44	vibracorer	Pebbly, shelly sand, 40 cm
403	59°27.1'N 152°38.2'W	61	vibracorer	Clean sand, wash out
404	59°31.2'N 153°07.6'W	39	grab sampler	Gray mud
405	59°28.2'N 153°11.8'W	35	grab sampler	Gray mud
406	59°27.4'N 152°38.0'W	60	vibracorer	Sand, 130 cm
407	58°52.7'N 152°55.4'W	171	gravity corer	Gray to green sandy mud, 215cm
408	58°52.5'N 152°56.1'W	168	gravity corer	Gray to green sandy mud
409	58°55.6'N 152°57.0'W	171	gravity corer	Gray to green sandy mud, 200cm
410	58°55.3'N 152°57.5'W	172	gravity corer	Gray to green sandy mud, 240cm
411	58°53.9'N 152°58.4'W	167	gravity corer	Gray to green sandy mud, 200cm
412	58°52.4'N 152°57.9'W	167	gravity corer	Gray to green sandy mud, 260cm
413	59°07.6'N 153°07.4'W to 59°06.8'N 153°06.9'W	100	TV/Camera	Observations of comet marks

414	59°27.6'N 152°33.2'W	65	vibracorer	Sand, 150 cm
415	59°31.0'N 152°38.7'W	64	vibracorer	No recovery
416	59°46.3'N 152°29.0'W	75	vibracorer	No recovery
417	59°46.5'N 152°29.0'W	80	vibracorer	No recovery
418	59°41.9'N 152°26.1'W	81	grab sampler	Sand with boulders
419	59°39.8'N 152°20.6'W	57	grab sampler	Sand with boulders
420	59°39.9'N 152°45.1'W	32	grab sampler	Shelly, pebbly sand
421	59°45.1'N 152°45.2'W	33	grab sampler	Shelly sand
422	59°49.7'N 152°37.9'N	34	grab sampler	Sand with boulders
423	59°50.1'N 152°29.5'W	40	grab sampler	Sandy gravel
424	59°54.7'N 152°14.6'W	70	grab sampler	Sand
425	60°00.0'N 152°09.2'W	72	grab sampler	Gravelly sand
426	60°00.1'N 151°59.8'W	52	grab sampler	Bouldery, gravelly sand
427	59°50.1'N 151°55.2'W	35	grab sampler	Bouldery gravelly sand
428	59°50.0'N 152°06.8'W	45	grab sampler	Gravel
429	59°50.0'N 152°14.6'W	75	grab sampler	Shelly, gravelly sand
430	59°49.1'N 152°20.1'W	84	grab sampler	Gravelly sand

431	59°44.8'N 152°33.5'W to 59°47.6'N 152°29.7'W	35	TV/Camera	Observe wall of Cook Trough
432	57°25.5'N 151°23.3'W	175	gravity corer, vibracorer	Green, ash-rich mud, 180cm
433	57°26.7'N 151°25.3'W	174	vibracorer	Green, ash-rich mud, 165cm
434	57°24.4'N 151°21.3'W	176	vibracorer	Ash-rich mud, 30cm
435	57°15.0'N 151°17.1'W	158	vibracorer	Ash-rich mud, 100cm
436	57°16.1'N 151°13.3'W	143	gravity corer	No recovery
437	57°01.1'N 152°10.3'W	77	vibracorer	Shelly, sandy gravel, 10cm
438	57°01.2'N 152°10.6'W to 57°01.2'N 152°01.4'W	76	TV/Camera	Attempt to observe gas seep; no success
439	56°40.6'N 153°12.6'W	159	gravity corer	Ash-rich mud, 224cm
440	56°39.2'N 153°06.4'W	156	gravity corer	Ash-rich mud, 243cm
441	56°39.5'N 153°04.6'W	164	gravity corer	Ash-rich mud, 214cm
442	56°39.1'N 153°02 1'W	135	vibracorer	Ash-rich mud, 111cm
443	56°38.6'N 152°57.4'W	82	vibracorer	Muddy sandy gravel few cm
444	56°22.9'N 153°15.8'W	42	grab sampler	Gravelly sand
445	56°11.2'N 153°17.3'W	1003	gravity corer	Mud, 225cm
446	56°05.9'N 153°51.5'W	213	vibracorer	Sandy mud

447	56°20.7'N 153°50.8'W	94	grab sampler	Gravelly sand
448	56°23.2'N 154°18.8'W	42	grab sampler	Sand
449	56°08.1'N 154°17.3'W	97	grab sampler	Gravelly sand
450	55°56.1'N 154°14.1'W	390	gravity corer	Sandy mud
451	55°56.7'N 154°41.9'W	371	grab sampler	Muddy sand
452	56°00.0'N 155°07.1'W	67	grab sampler	Sand
453	56°14.1'N 155°09.8'W	32	grab sampler	Shelly pebbly gravel
454	56°12.1'N 154°42.8'W	89	grab sampler	Shelly, pebbly sand
455	56°12.4'N 152°58.4'W	1750	gravity corer	Gray-green mud, 228cm

Table 5. Navigation logs from cruise S8-79-WG in Lower Cook Inlet and on the Kodiak Shelf and Slope.

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) -79 (YR) - WG (AREA)

Rev. 2/75

Ship Sea Sounder Chief Scientist HAMPTON/BOUMA Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ½	DEG	MINUTES	LONGITUDE ½	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Dirgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or TA	Time ½ Int.	SPD
218	17	18				CASTING @ AF			DRC	134	0.0		+59	36.16		-151	24.67											
	17	30		TR		START TRANSIT				128	6.9			35.04			23.96											
	17	41								246	8.9			31.27			25.94											
	18	00								239	9.8			32.05			21.20											
	18	15								245	7.8			32.24			22.41											
	18	30								245	10.4			31.46			39.48											
	18	45								233	8.3			30.46			42.35											
	19	00								237	8.9			29.48			45.99											
	19	15								239	10.0			28.46			30.05											
	19	30								234	9.9			26.83			54.20											
	19	45								243	6.7			26.08			57.46											
	19	41				SAT 19			S					27.02			53.50			ELEV. 60.5		OFFSET	1.842					
	20	00							DRC	212	7.0			25.67			56.44											
	20	15							DRC	211	6.4			24.30			58.45											
	20	12				SAT 13			S					24.55			58.09			ELEV. 31.7		OFFSET	.080					
	20	30							DRC	211	6.2			22.97			59.87											
	20	45								212	6.3			21.74		-152	01.78											
	21	00								207	6.7			20.38			03.73											
	21	15								204	7.5			18.90			05.67											
	21	12				SAT 20			S					19.18			05.43			ELEV. 42.2		OFFSET	.082					
	21	30								202	8.1			17.69			07.29											
	21	45								206	8.7			15.39			09.99											
	22	00								203	10.0			13.48			12.32											
	22	16								201	8.3			11.73			15.02											
	22	30								207	8.4			10.17			16.95											
	22	45								193	8.4			08.25			18.79											
	23	00								194	8.4			06.30			19.79											
	22	56				SAT 20			S					06.37			19.79			ELEV. 62		OFFSET	.226					
	23	15				SAT - MAP SHOT PU			DRC	196	8.5	↓		04.49	↓		21.78			SHUT DOWN SYSTEM & MADE PATCHES - WHEN STARTED UP TO GRADE - RECORD - RE PATCH WOULD NOT TRACK SAT - RECORD WITH NO PATCH										

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) - 79 (YR) WC (AREA)

Ship Sea Sounder Chief Scientist HAMPTON/BOUMA Affiliation USGS

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Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ½	DEG	MINUTES	LONGITUDE ½	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Dirgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TR	Time ½ min	SPP
215	01	16		TR		SAT 14			S			+	58	46.98	-	152	14.97			SYSTEM CRASHED BY OPERATOR TO PUT IN								
	03	00				ROUTINE				153	11.4			30.14	-	151	53.89			PATCH - WAITING FOR SAT-FIX								
	03	00				SAT 14			S					30.19			53.73			START REGULAR RATIES								
	03	15							DRC	150	11.8			27.87			51.17											
	03	30							DRC	147	10.0			25.60			48.47											
	03	50				SAT 12			S					23.55			44.91			EL=45.1		OFFSET=	.256					
	04	00							DRC	147	10.8			21.09			41.49											
	04	19				SAT 19			S					18.00			41.34			EL=16.7		OFFSET=	.064					
	04	30							DRC	168	10.3			16.16			40.85											
	04	46							DRC	161	10.0			13.40			39.57											
	04	47				SAT 14			S					13.38			39.41			EL=60.5		OFFSET=	.016					
	05	00							DRC	169	10.5			11.13			38.66											
	05	15				ROUTINE			DRC	173	10.5			08.36			38.62											
	05	30				ROUTINE			DRC	171	10.2			05.80			35.03											
	05	36				SAT 12			S					04.66			37.63			EL=51.2		OFFSET=	0.03~~4~~					
	05	45				ROUTINE			DRC	164	10.3			03.28			37.08											
	06	00				ROUTINE			DRC	164	10.2			00.87			35.10											
	06	04				SAT 19			S			V		00.18			36.33			EL=50.8		OFFSET=	.031					
	06	15				ROUTINE			DRC	162	9.7	+	57	58.52			34.41											
	06	30				ROUTINE			DRC	166	8.9			56.30			35.23											
	06	45				ROUTINE			DRC	167	9.0			54.12			30.21											
	07	00				ROUTINE			DRC	166	8.9			51.83			31.28											
	07	15				ROUTINE			DRC	165	9.6			49.70			30.41											
	07	30				ROUTINE			DRC	167	9.4			47.39			29.80											
	07	45				ROUTINE			DRC	174	9.1			45.10			28.58											
	07	51				SAT 19			S		9.9			44.19			28.24			EL=51.2		OFFSET=	.023					
	08	00				ROUTINE			DRC	171	9.7			42.85			27.75											
	08	15				ROUTINE			DRC	170	9.2			40.64			27.07											
	08	30				ROUTINE			DRC	173	9.5			38.32			26.42											
	08	24				SAT 13			S					39.24			26.66			EL=26.3		OFFSET=	.018					
V	08	45		V	V	ROUTINE			DRC	180	9.6	V		35.96	V		26.28	V										
	09	00				ROUTINE			DRC	181	9.6			33.69			26.30											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) -79 (YR) -W6 (AREA)

Ship SEA SOUNDER Chief Scientist HAMPTON/BOWNE Affiliation USGS

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Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	WIND SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Drgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or T.D.	Time ½ Lo.	SPP
219	09	15		TR					DRC	188	4.3	+	57	31.59	-	151	26.41											
	09	30		TR					DRC	173	4.2			30.53			26.49											
	09	39		TR		SAT 19			S	176	4.6			29.87			26.40			R. 16.4		offset .05B						
	09	45		TR					DRC	180	4.3			29.40			26.29											
	10	00		TR					DRC	178	4.8			28.30			26.15											
	10	13		TR		EOL TR			DRC	184	4.8			27.25			25.99											
	10	15		TR		TURNING			DRC	159	5.0			27.14			25.94											
	10	16		452		SOL 452			DRC	192	5.2			27.07			25.85											
	10	30		452					DRC	144	4.9			26.22			24.52											
	10	45		452					DRC	144	4.6			25.36			23.02											
	11	00		452					DRC	146	4.7			24.48			21.58											
	11	15		452					DRC	143	4.7			23.57			20.06											
	11	22		452		EOL 452			DRC	137	4.9			23.14			19.36											
	11	30				TURNING			DRC	028	4.4			23.14			18.54											
	11	34		453		SOL 453			DRC	350	4.3			23.38			18.37											
	11	34		453		SAT 20			S	350	4.3			23.41			18.37			R. 34.0		offset .004						
	11	45		453					DRC	344	6.5			24.56			18.89											
	12	00		453					DRC	352	7.0			26.23			19.45											
	12	03		453		EOL 453			DRC	350	6.8			26.62			19.59											
	12	09		454		SOL 454			DRC	238	5.0			26.80			20.04											
	12	15		454					DRC	247	4.4			26.51			20.61											
	12	30		454					DRC	259	4.8			25.96			22.97											
	12	45		454					DRC	255	4.8			25.39			24.56											
	13	00		454					DRC	258	4.0			24.83			26.34											
	13	15		454					DRC	261	4.2			24.35			28.06											
	13	28		454		EOL 454			DRC	257	4.5			23.94			29.66											
	13	32		455		SOL 455			DRC	052	3.9			23.45			29.90											
	13	45		455					DRC	031	6.4			24.95			28.75											
	14	00		455					DRC	033	6.4			26.31			27.26											
	13	59		455		SAT 14			S	031	6.5			26.86			27.34			R. 22.6		offset .05						
	14	15		455					DRC	034	6.7			27.73			25.59											
	14	16		455		EOL 455			DRC	032	6.7			27.82			25.96											

U.S.G.S. NAVIGATION LOG

Cruise Locator 18 - 79 - WG (ID. / YR / AREA)

Rev 2/75

Ship Sea Sounder Chief Scientist Hampton/Bouma Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ±	DEG	MINUTES	LONGITUDE ±	DEG	MINUTES	WIND Dir.	WIND SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Dirgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TA	Time or Min	SPP
219	14	19		456		SOL 456			DRC	143	6.0	+	57	27.95	-	151	25.03											
	14	30		456					DRC	137	5.1			27.17			24.21											
	14	45		456					DRC	137	5.3			26.08			22.78											
	15	00		456					DRC	127	4.9			25.02			21.33											
	15	15		456					DRC	125	4.7			24.15			20.01											
	15	21		456		EOL 456			DRC	127	4.6			23.77			19.50											
	15	30		TR					DRC	127	4.6			23.20			18.70			pulling side scan								
	15	33		TR		START TR TO STA			DRC	134	4.5			23.03			18.35			start transit to station 432								
	15	45		TR					DRC	316	7.5			23.63			19.75											
	16	00		TR					DRC	314	6.6			24.79			22.25											
	16	15		TR					DRC	236	6.6			25.70			23.06											
	16	19			432	ON STATION 432			DRC	191	0.7			25.46			23.32											
	16	30			432				DRC	279	0.9			25.56			23.35											
	16	45			432				DRC	261	1.2			25.48			23.60											
	16	50			432	ON BOTTOM 432P1			DRC	257	1.1			25.40			23.69			P-1,								
	17	00			432				DRC	265	0.8			25.30			23.86											
	17	05			432	SAT 19			S					24.36			24.05			ELEV. 24.5		OFFSET .889						
	17	15			432				DRC	262	0.9			25.15			24.22											
	17	30			432				DAC	248	1.1			24.13			24.67											
	17	33			432	SAT 14			S					24.15			24.82			ELEV. 30.2		OFFSET .023						
	17	45			432				DRC	277	1.0			24.09			25.05											
	18	00			432				DAC	002	2.0			24.11			25.51			DRIFTED OFF STATION - STEAMING BACK								
	18	15			432	MANUVER ON STA			DAC	047	4.1			25.33			23.67											
	18	24			432	ON BOTTOM G-1			DAC	095	1.1			25.50			23.43			G-1								
	18	30			432				DAC	113	0.9			25.57			23.46											
	18	45			432				DAC	095	0.4			25.51			23.37											
	19	00			432				DAC	106	0.7			25.52			23.45											
	19	15			432				DAC	105	1.2			25.52			23.63											
	19	20			432	ON BOTTOM V-1			DAC	107	0.9			25.55			23.74			V-1								
	19	30			432				DAC	127	0.5			25.48			23.51											
	19	45			432				DAC	110	0.3			25.53			23.43											
↓	19	53			432	END STA 432			DAC	142	1.0			25.52			23.39											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) -79- (YR) uc (AREA)

Ship Sea Seeker Chief Scientist HAMILTON / BARNARD Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or T.A.	Time ½	SPP
219	19	59		TR		START TRANSIT			DRC	320	7.1	+	57	25.59	-	151	23.69											
	20	00		TR					DRC	321	7.9			25.65			23.80											
	20	10		TR		END TRANSIT			DRC	333	3.4			26.54			25.06											
	20	15				MANUVERING			DRC	010	3.2			26.69			25.23											
	20	30				MANUVERING			DRC	142	1.3			26.68			25.23											
	20	36			433	ON STATION			DRC	163	1.2			26.68			25.23											
	20	45			433				DRC	146	0.2			26.71			25.25											
	20	50			433	ON BOTTOM V-2			DRC	143	0.1			26.71			25.26			V-2								
	21	00			433				DRC	223	2.4			26.75			25.38			VIBRA CORE DAMAGED, HOLD STATION UNTIL IT IS REPAIRED								
	21	15			433				DRC	301	2.7			27.11			25.85											
	21	30			433				DRC	127	3.1			27.07			25.88											
	21	45			433	END STATION			DRC	177	.4			26.69			25.17											
	21	52		TR		START TRANSIT			DRC	135	4.5			26.64			24.98											
	21	49				SAT 20			S					26.84			25.54			ECHO 677		OFFSET .216						
	22	00		TR					DRC	140	3.0			26.41			24.53											
	22	15		TR					DRC	146	5.7			25.46			22.99											
	22	30		TR					DRC	146	2.7			24.88			22.40											
	22	39		TR		END TRANSIT			DRC	126	0.9			24.52			21.65											
	22	41			434	ON STATION			DRC	199	1.3			24.47			21.49											
	22	45			434				DRC	129	0.6			24.42			20.84											
	23	00			434				DRC	301	1.8			24.36			21.11											
	23	09			434	ON BOTTOM, V-2			DRC	278	0.5			24.45			21.30			V-2								
	23	15			434				DRC	304	0.2			24.47			21.33											
	23	30			434				DRC	109	0.8			24.55			21.33											
	23	45			434	END STATION			DRC	010	0.3			24.72			21.36			LOST VIBACORE !!?!								
220	00	00				SEARCH			DRC	004	0.4			24.86			21.50											
	00	15							DRC	125	2.3			24.68			21.60											
	00	30							DRC	172	2.8			24.67			21.45											
	00	45							DRC	283	1.0			24.46			21.11											
	01	00							DRC	334	1.3			24.51			21.36											
	01	15							DRC	247	0.5			24.35			21.40											
	01	30							DRC	058	3.6			24.51			21.40											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) - 79 (YR) - WC (AREA)

Rev. 2/75

Ship Sea Sounder Chief Scientist HAMPTON/BOWNE Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ½	DEG	MINUTES	LONGITUDE ½	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or T.D.	Time ½ Min.	SPP
220	02	00		SRC		SEARCH FOR V-CORE	F		DRC	277	11.6	+	57	24 38	-	151	21 21											
	02	30		SRC					DRC	013	0.8			24 53			21 23											
	03	00		SRC					DRC	201	2.1			24 43			21 23											
	03	15				RECOVERED V-CORE			DRC	164	0			24 37			21 17											
	03	50		TRN		TRANSIT			DRC	135	6.2			24 17			21 06											
	04	00							DRC	131	5.9			23 45			19 08											
	04	15							DRC	135	6.1			22 45			17 02											
	04	30				TRANSIT			DRC	136	5.6			21 43			15 58											
	04	45							DRC	125	5.4			20 37			14 40											
	05	00				TRANSIT			DRC	139	5.1			19 49			12 49											
	05	15							DRC	132	5.1			18 57			10 91											
	05	30		V					DRC	137	4.6			17 73			09 40											
	05	34		TRN		EOL TRANSIT				135	3.9			17 55			07 12											
	05	41		457		SOL 457			DRC	198	3.9			17 09			09 08											
	05	45				SP1			DRC	242	4.4			16 98			09 29											
	06	00				SP2			DRC	249	4.4			16 68			11 25											
	06	15				SP3			DRC	206	5.4			16 13			13 40											
	06	30				SP4			DRC	243	5.6			15 46			15 63											
	06	45				SP5			DRC	236	5.4			14 81			17 87											
	07	00		V		SP6			DRC	243	5.5			14 15			20 15											
	01	15		4531		SP7			DRC	234	6.0			[illegible]		3.50	[illegible]						22.50					
	07	18		457		EOL 457																						
	07	30		458		SOL 458 SRD			DRC	120	[illegible]			13 [illegible]			24 61											
	07	34				SAT 13			S	212				14 57			26 17			ELEV 44.6				Tide -.595		OFFSET 1.199		
	07	48				SP1			DRC	11	6.2			16 03			25 66											
	08	00				SP2			DRC	031	6.1			17 14			24 71											
	08	15		V		SP3			DRC	031	6.6			18 51			23 13											
	08	20		458		EOL 458			DRC	027	4.9			18 98			22 64											
	08	34		459		SOL 459			DRC	155	5.0			18 60			21 05											
	08	45				SP1			DRC	161	4.5			18 13			20 38											
	09	00							DRC	164	4.3			17 23			19 97											
	09	15							DRC	161	4.6			16 [illegible]			17 [illegible]											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) - 79 (YR) - 416 (AREA)

Ship Sea Sounder Chief Scientist Hampton/Bouma Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Qual'ty	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TA	Time +/-	SPP
220	09	30		459					DRC	159	5.4	+	57	15515	-	151	17335											
	09	45		459					DRC	155	5.9			13944			16553											
	10	00		459					DRC	153	5.5			12772			15211											
	10	15		459					DRC	149	5.0			11600			13998											
	10	26		459		EOL 459			DRC	148	4.5			10495			13227											
	10	30							DRC	150	4.8			10677			12947			parking in gear transit to station 435								
	10	44		TR		SOL TR TO ST 435			DRC	153	5.8			09660			11778											
	10	45		TR					DRC	151	6.2			09555			11775											
	11	00		TR					DRC	336	10.0			11113			13887											
	11	15		TR					DRC	329	9.5			13206			15999											
	11	30		TR					DRC	334	7.3			15156			17566											
	11	35			435	ON STATION 435			DRC	136	1.6			15066			17377											
	11	45			435				DRC	121	0.4			15011			17220											
	11	55			435	ON BOTTOM V-1			DRC	117	0.3			15044			17107			V-1								
	12	00			435				DRC	132	0.1			15056			17107											
	12	15			435				DRC	111	0.7			14988			16811											
	12	12			435	SAT 20			S	119	0.7			15488			17366			d. 20.4	offset .551							
	12	30			435				DRC	111	0.2			15444			17177											
	12	45			435				DRC	116	0.3			15355			17177											
	13	00			435				DRC	124	0.6			15244			17155											
	13	04			435	LV STA 435			DRC	067	0.7			15119			17111											
	13	15		TR					DRC	059	8.9			15771			14677											
	13	23			436	ON STATION 436			DRC	095	1.0			16014			13330											
	13	28			436	ON BOTTOM G-1			DRC	108	0.0			16014			13329			G-1, no recovery								
	13	30			436				DRC	089	0.0			16014			13330											
	13	45			436				DRC	151	0.1			16013			13330											
	13	58			436	ON BOTTOM G-2			DRC	163	1.3			16001			13553			G-2, no recovery								
	14	00			436				DRC	149	0.8			15998			13554											
	14	06			436	ON BOTTOM G-3			DRC	146	0.9			15910			13655			G-3,								
	14	15			436				DRC	147	0.9			15811			13869											
	14	19			436	LV STATION 436			DRC	239	11.0			15713			13991			Start Transit to Line 460								
	14	24		TR					DRC	243	9.5			15547			14330											

U.S.G.S. NAVIGATION LOG

Cruise Locator A8 - 79 - WG (ID. / YR / AREA)

Ship Sea Sounder Chief Scientist Hampton/Bourne Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ±	DEG	MINUTES	LONGITUDE ±	DEG	MINUTES	WIND Dir.	BFD	VISUAL, RADAR, ETC. OBJECT	Angles	Degs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or TB	Time ½ Min.	GPP
220	1445			TR					DRC	260	10.0	+	57	13788	-	151	19185			Transit to line 460								
	1455			TR		SAT 14			D	248	10.2			12774			22995			el. 44.6		offset .340						
	1500			TR					DRC	249	10.4			12477			23395											
	1513			TR					DRC	246	10.2			10998			28388											
	1530			TR					DRC	243	10.1			09771			35440											
	1545			TR					DRC	239	10.6			08831			36446											
	1600			TR					DRC	239	10.3			06997			40554											
	1615			TR					DRC	237	10.1			05655			44459											
	1630			TR					DRC	243	9.8			04332			48331											
	1642			TR		SAT 14			S	241	9.8			03135			51445			el. 53.4		offset .023						
	1645			TR					DRC	240	9.9			03007			52221											
	1700			TR						237	10.2			01177			56614											
	1715			TR						241	10.1			00042	-	152	00065											
	1730			TR						232	10.0	+	56	59235			04235											
	1745			TR		END TRANSIT				233	4.3			57728			07665											
	1751			460		START LINE 460				225	4.9			57665			08332											
	1800									273	4.8			57721			09962											
	1804					SAT 19			S					57760			10906			ELEV. 48.2		OFFSET .142						
	1815								DRC	270	4.6			57761			11165											
	1828					SAT-NAV CRASH														PROGRAM DOWN - NO APPARENT REASON								
220	1858			460					S			+	56	58808	-	152	17226			ELEV. 8.3		OFFSET 2.132						
	1915								DRC	269	4.5			58117			19588											
	1930									250	4.0			58405			21449											
	1945									252	4.1			58721			23310											
	1950					SAT 19			S					58752			23890			ELEV. 48.3		OFFSET .135						
	2000								DRC	275	5.4			58753			25119											
	2009			460		END LINE 460			DRC	228	4.8			58763			26554											
	2011			461		START LINE 461				120	3.4			58723			26720											
	2030			461						116	4.1			56911			25887											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) -79- (YR) WG (AREA)

L.E 2/75

Ship Sea Sounder Chief Scientist HAMPTON/BOUMA Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TS	Time +/- min.	GPP
220	20	21		461		SAT 13			S			+	56	57274	-	1	52	26663	ELEV	24.6		OFFSET	.034					
	20	45							DRC	127	4.1			56227				24136										
	20	42				SAT 20			S					56443				24446	ELEV	30.4		OFFSET	.028					
	21	00							DRC	132	4.4			55555				22800										
	21	15								132	4.6			54774				21229										
	21	30								132	4.3			53994				19658										
	21	45								133	4.8			53212				18297										
	21	48		461		END LINE 461				134	4.5			52996				17978										
	21	53		462		START LINE 462				358	7.7			53220				17660										
	22	00								008	4.6			53379				17721										
	22	15								004	4.4			54491				17721										
	22	45								013	4.6			57219				17721										
	23	00								008	4.5			58332				17669										
	23	15								001	4.7			59447				17665										
	23	30								359	4.3	+	57	00662				17688										
	23	45								001	4.6			01776				17721										
	23	49		462		END LINE 462				004	4.5			02088				17220										
	23	53		463		START LINE 463				091	3.9			02227				12447										
221	00	00								105	4.4			02332				16554										
	00	15								103	4.8			02221				14445										
	00	13				SAT 20			S					02225				14710	ELEV	22.2		OFFSET	.041					
	00	30							DRC	105	4.8			02116				12333										
	00	43		463		END LINE 463				101	4.8			02111				10443										
	00	46		464		START LINE 464				184	4.2			02301				10217										
	01	00		464					DRC	184	4.0			01112				10025		observed		across the ocean records						
	01	15		464					DRC	175	4.1			00915				10553										
	01	30		464					DRC	171	4.1			00730				10907										
	01	45		464					DRC	171	4.1			00545				11261										
	02	00		464					DRC	174	4.1			00359				11612										
	02	15		464					DRC	172	4.0			00214				11971										
	02	30		464					DRC	180	3.9			00025				12328										
	02	35		464		END 464			DRC	183	3.9			59893				11776										

U.S.G.S. NAVIGATION LOG

Cruise Locator 18 - 79 - WG (ID. / YR / AREA)

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Ship Sea Sounder Chief Scientist Hampton/Bouma Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ±	DEG	MINUTES	LONGITUDE ±	DEG	MINUTES	WIND Dir.	WIND SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Dist	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or TR	Time ½ Int.	SPP
221	02	45		—		BUILDING EQUIP.			DRC	182	0.5.2	+	56	54241	-	152	11910											
	02	50		TR		START TR TO STA 437			DRC		11.3			53380			11550			Begin transit to station 437								
	03	00		TR					BRG	1 5	9.1			54973			11661											
	03	03		TR		SAT 14			S					55095			11665			elev = 42.6			freq. -.209		offset .095			
	03	15		TR					DRC	6	10.1			57337			11119											
	03	30		TR					DRC	8	9.7			59777			10577											
	03	42			437	ON STA 437			DRC		—		57	01118			10124											
	04	14			437	ON BOTTOM V1			DRC					01114			10331			one bag ~~set~~ set. recovered								
	05	07			437	ON BOTTOM V2			DRC					01110			10223											
	05	39			437	ON BOTTOM V3			DRC					00976			10033											
	06	20			438	ON STA 438			DRC					01888			12218			~~camera in water~~								
	06	40			438	CAMERA IN WATER			DRC					01216			10771			camera in water								
	06	50			438	ON BOTTOM			DRC					01211			10558			camera on bottom - begin survey								
	07	00			438				LOC	107	1.5			01115			10338											
	07	30			438				DRC	134	.5			01112			10326											
	07	51			438	CAMERA OFF BOT			DRC	131	.5			01123			10338											
	08	01			438	END STN 438			DRC	195	1.5			01130			10497											
	08	05		TR		SOL TRANSIT			DRC	30°	3.7			01128			10668			start transit to line 465								
	06	00		TR		SAT 19			S					02219			11114			elev 43.2			freq -.361		offset .976			manual update
	08	15		TR					DRC	207	6.3			01449			12411											
	08	30		TR					DRC	211	9.8	+	56	59922			19113											
	08	32		TR		SAT 13			S	210	9.2			59611			19422			el 22.0			offset .039					
	08	45		TR					DRC	214	9.0			58104			16355											
	09	00		TR					DRC	223	9.4			56411			19288											
	09	15		TR					DRC	220	9.3			54776			22322											
	09	30		TR		SAT 20			S	224	8.7			54117			23455			el. 44.8			offset .023					
	09	30		TR					DRC	223	9.4			53111			25537											
	09	45		TR					DRC	225	9.5			51947			28891											
	10	00		TR					DRC	230	9.2			49822			31443											
	10	15		TR					DRC	228	9.3			48155			34410											
	10	30		TR					DRC	232	9.4			46555			37499											
	10	45		TR					DRC	224	8.5			44914			40034											

U.S.G.S. NAVIGATION LOG

Cruise Locator 18 - 79 - WG (ID. / YR / AREA)

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Ship Sea Sounder Chief Scientist Hampton/Bourne Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ±	DEG	MINUTES	LONGITUDE ±	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS TR	Time ½	SPP
221	11	00		TR					DRC	246	8.5	+	56	4367	-	152	4365											
	11	05		TR		SAT 20			S	221	8.9			1327			4484	el.	46.7	offset		.021					
	11	15		TR					DRC	217	8.5			1711			4697											
	11	30		TR					DRC	222	9.2			4036			4880											
	11	45		TR					DRC	218	9.0			3975			5165											
	11	52		TR		EDL TR			DRC	219	9.2			3795			5303											
	11	55		465		SDL 465			DRL	293	5.1			3796			5361											
	12	00		465					DRC	264	4.7			3801			5430											
	12	15		465					DRC	275	4.8			3830			5644											
	12	30		465					DRC	276	4.6			3857			5847											
	12	45		465					DRC	276	4.7			3880		153	0038											
	13	00		465					DRC	278	4.7			3909			0252											
	13	15		465					DRC	289	4.6			3942			0453											
	13	30		465					DRC	279	4.5			3968			0656											
	13	45		465					DRC	290	5.5			3992			0860											
	14	00		465					DRC	293	3.9			4024			1071											
	14	02		465		SAT 14			DRC	291	5.6			4030			1101	el.	23.1	offset		.013						
	14	15		465					DRC	292	4.8			4058			1284											
	14	16		465		EDL 465			DRC	289	4.2			4061			1297											
	14	24		466		SDL 466			DRC	285	5.0			4065			1337											
	14	33		466					DRC	278	4.2			4073			1479											
	14	45		466					DRC	290	4.3			4087			1646											
	15	00		466					DRC	285	4.7			4112			1861											
	15	15		466					DRC	293	4.5			4134			2080											
	15	30		466					DRC	287	4.5			4154			2295											
	15	45		466					DRC	290	4.9			4177			2511											
	16	00		466					DRC	287	4.6			4197			2708											
	16	15		466		C/C			DRC	131	3.5			4204			2846											
	16	45		466					DRC	123	3.7			4211			3112											
	17	00		466					DRC	109	4.4			4101			3262											
	17	15		466					DRC	134	5.4			3956			3365											
	17	19		466					S					3966			3376	ENE	26.2	OFFSET		.041						

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) -79 (YR) -W6 (AREA)

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Ship Sea Sounder Chief Scientist HAMPTON / BOUMA Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	WIND SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TD	Time +/- min	OFF
221	17	45		466					DRC	174	4.5	+	56	37.77	-	153	21.65											
	18	01								161	5.8			36.43			20.58											
	18	15								152	5.5			35.28			19.64											
	18	30								152	5.2			34.12			18.65											
	18	45								154	4.8			32.99			17.36											
	19	00								140	4.6			31.89			16.53											
	19	15								143	4.9			30.37			15.41											
	19	30				CHANGE COURSE				164	5.4			29.29			14.39											
	19	44								232	4.4			28.49			16.20											
	20	00								216	5.3			27.84			17.92											
	20	15								200	4.2			26.91			19.83											
	20	18		466		END LINE 466				201	4.0			26.77			20.10											
	20	28		467		START LINE 467				324	8.4			26.64			21.94											
	20	30								535	6.5			26.76			21.67											
	20	45								330	4.0			27.92			22.36											
	21	00								300	4.0			28.75			23.39											
	21	15								322	3.2			29.40			24.02											
	21	20				SAT 20			S					29.99			24.20	ELEV.	46.8	OFFSET		.614						
	21	30							DRC	316	4.3			30.63			25.14											
	21	45								305	5.3			31.27			27.40											
	22	00								330	4.6			32.08			28.96											
	22	15								324	4.7			32.96			30.31											
	22	30								328	4.0			33.84			31.55											
	22	45								329	4.5			34.59			32.73											
	23	00								320	4.6			35.53			34.27											
	23	05				SAT 20			S					35.77			35.20	ELEV.	50.0	OFFSET		.516						
	23	15							DRC	318	5.0			36.40			35.28											
	23	30								331	5.9			37.16			37.90											
	23	45								313	5.2			38.67			39.44											
222	00	00								312	5.5			37.65			41.06											
	00	15								329	4.0			40.47			42.39											
	00	30								324	4.7			41.37			43.80											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 - 79 - WG (ID. / YR / AREA)

Ship SEA SPIDER Chief Scientist HAMPTON/BOUMA Affiliation USGS

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Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ½	DEG	MINUTES	LONGITUDE ½	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS	Time ½	SPP
222	00	45		467		SP 17			DRC	320	5.0	+	56	42.33	-	153	45.31											
	01	00				SP 18			DRC	311	5.3			43.27			46.81			#								
	00	52		W		SAT 20			S					42.06			46.09			EL= 13.9		OFFSET:	.727					
	01	15		467		SP 19 EOL 467			DRC	318	5.4			43.35			48.92											
	01	20		TRN		SO TRANSIT			DRC	180	4.4			43.51			48.87											
	01	30		TRN					DRC	160	3.6			43.01			48.75											
	01	45		TRN					DRC	116	7.0			41.77			48.44											
	02	00							DRC	186	7.0			40.03			48.32											
	02	15							DRC	186	6.8			38.18			48.79											
	00	12				SAT 14			S					38.67			48.62			elev 22.4		dfset	.083	Freq	1703			
	02	30							DRC	198	7.2			36.37			48.87											
	02	45							DRC	120	6.5			34.88			49.27											
	03	00							DRC	144	7.1																	
	03	00				SAT 18			DRC	194	7.1			32.20			49.65											
	02	50				SAT 12			S					34.25			49.19			elev 21.8		dfset .075		Freq	.644			
	03	13		TRN		EOL TRANSIT			DRC	149	6.0			31.69			49.87											
	03	15		468		SO 4 468			DRC	138	4.0			31.60			49.36											
	03	30		468					DRC	131	3.7			30.77			48.53											
	03	45		468					DRC	138	4.9			30.00			47.19											
	04	00		468					DRC	142	3.5			29.23			45.26											
	04	15		468					DRC	149	4.2			28.39			44.75											
	04	30		468					DRC	132	4.5			27.58			43.14											
	04	46		468					DRC	139	4.7			26.82			42.08											
~~222~~	~~05~~	~~07~~		~~468~~		~~SAT 10~~			~~S~~					~~26.14~~			~~42.04~~			~~elev 21.6~~		~~Freq 136~~		~~dfset .088~~				
	05	00		468					DRC	143	6.0			25.86			40.58											
	05	15		468		SAT			DRC	145	5.5			24.94			39.13											
	05	30		468					DRC	141	4.3			24.03			37.73											
	05	44		468		SAT 19			S					24.49			38.24			elev. 32.5		offset .151		Freq -.348				
	05	45		468					DRC	149	5.4			23.24			36.29											
	05	45		468		SAT 14			S					23.59			36.31			elev 27.5		offset .029		Freq .791				
	06	00		468					DRC	152	5.3			22.42			35.05											
	06	18		468					DRC	145	3.6			21.51			33.64											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) - 79 (YR) - WG (AREA)

Ship RV Sea Sounder Chief Scientist Hampton/Bourne Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or TR	Time or Min	SPD
222	0630			468					DRC	150	5.3	+	56	2075	-	153	3038											
	0645			468					DRC	148	3.6			1996			3115											
	0700			468					DRC	134	3.10			1956			2963											
	0715			468					DRC	150	3.2			1858			2817											
	0730			468					DRC	165	5.1			1756			2703											
	0745			468					DRC	153	5.2			1696			2609											
	0752			468		SAT 13			S					1658			2615			elev. = 39.3			offset = .053 freq = .546					
	0800			468					DRC	133	4.7			1554			2414											
	0815			468					DRC	144	5.7			1457			2239											
	0830			468					DRC	137	5.9			1344			2074											
	0845			468					DRC	123	4.8			1252			1942											
	0900			468					DRC	137	4.9			1159			1793											
	0904			468		EOL 468			DRC	140	5.0			1112			1719											
	0909			TR		SOL TR TD 50469			DRC	178	5.0			1096			1705											
	0915			TR					DRC	222	7.0			1048			1764											
	0930			TR					DRC	219	7.3			0909			1971											
	0945			TR					DRC	214	6.9			0771			2168											
	1000			TR					DRC	212	7.1			0634			2362											
	1015			TR					DRC	216	6.9			0499			2558											
	1023			TR		EOL TR			DRC	211	7.2			0414			2672											
	1027			969		SOL 469			DRC	273	8.6			0390			2737											
	1030			969					DRC	331	7.4			0317			2761											
	1045			969					DRC	334	4.0			0512			2877											
	1100			969					DRC	217	4.3			0596			2994											
	1115			969					DRC	324	4.4			0678			3129											
	1130			969					DRC	323	4.2			0760			3253											
	1143			969		SAT 20			S	320	4.0			0828			3368			el. 27.8			freq. .292 offset .029					
	1145			969					DRC	329	3.9			0858			3374											
	1200			969					DRC	328	4.7			2111			3499											
	1215			969					DRC	326	4.2			0991			3621											
	1230			969					DRC	322	4.9			1082			3763											
	1245			969					DRC	320	5.0			1177			3913											

U.S.G.S. NAVIGATION LOG

Cruise Locator 18 - 79 - WG (ID. / YR / AREA)

DATE 2/78

Ship Sea Sounder Chief Scientist Hampton/Bouma Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TR	Time +/-	SPP
222	13	00		469					DRC	323	4.8	+	56	12.69	-	153	90.59											
	13	15		469					DRC	319	4.8		7	13.60			42.03											
	13	30		469					DRC	320	5.0			14.53			43.36											
	13	45		469					DRC	320	6.6			15.57			45.14											
	14	00		469					DRC	313	6.4			16.42			46.54											
	14	15		469					DRC	317	3.7			17.12			47.64											
	14	30		469					DRC	315	4.1			18.09			49.19											
	14	45		469					DRC	318	5.5			19.08			50.79											
	14	58		469		SAT 14			S	323	4.2			19.79			52.06			ed. 44.7	freq. -.771		offset .043					
	15	00		469					DRC	326	4.2			19.85			52.17											
	15	15		469					DRC	332	4.4			20.77			53.51											
	15	30		469					DRC	326	4.9			21.69			54.95											
	15	45		469					DRC	327	4.8			22.61			56.47											
	16	00		469					DRC	333	4.5			23.52			57.91											
	16	15		469					DRC	326	4.6			24.43			59.34											
	16	30		469					DRC	334	4.7			25.31	-	154	00.83											
	16	45		469					DRC	330	4.7			26.24		7	02.16											
	16	51		469		EOL 469			DRC	326	4.9			26.60			02.76											
	16	53		TR		SOL TR			DRC	267	5.9			26.70			63.14			Start transit to 770								
	16	45		469		SAT 14			S					26.26			02.24			ELEV. 51.1			offset .038					
	17	00		TR					DRC	264	5.8			26.66			04.16											
	17	15								275	6.6			26.70			06.84											
	17	30								265	6.7			26.72			09.52											
	17	45								268	6.7			26.71			12.03											
	18	00				CHANGE CRS				225	6.6			26.44			16.08			FISHING LINE BUOYS								
	18	15								145	4.7			25.74			16.58											
	18	13				SAT 19			S					25.93			16.68			ELEV: 52.8			offset: .058					
	18	30							DRC	193	6.8			24.42			16.09											
	18	45				END TRANSIT				192	6.5			23.48			18.81											
	18	46		470		START LINE 470				130	6.4			23.32			18.74											
	19	00								134	4.1			22.66			17.47											
	19	15								141	5.1			21.64			15.92											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 - 79 - W6 (ID. / YR / AREA)

E 2/75

Ship SEA SOUNDER Chief Scientist HAMPTON / BOUMA Affiliation U.S.G.S.

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or T.S.	Time or Min.	SPP
222	19	30		420					DRC	119	5.5	+	56	20666	-	154	14554												
	19	45								127	5.2			19278			12853												
	20	00								129	5.3			18789			11333												
	20	00				SAT 19								18716			11337			ELEV: 41.9			OFFSET .036					
	20	15								130	4.7			17275			09777												
	20	30								128	5.1			16883			08222												
	20	30				SAT 13			S					16885			28117			ELEV 21.3			OFFSET .011					
	20	45							DRC	140	5.8			15911			06558												
	21	00								140	5.6			14892			05117												
	21	15								141	5.0			14011			03702												
	21	30								137	5.5			13000			02119												
	21	45								135	5.0			12111			00666												
	22	00								135	4.5			11117	-	1513	59225												
	22	15								136	5.9			10009			57663												
	22	30								132	6.0			09111			56053												
	22	45								135	5.6			08116			54452												
	23	00								135	5.3			07116			53004												
	23	15								133	4.7			06127			51559												
	23	30								132	4.8			05132			50056												
	23	45							DRC	135	4.8			04140			48643												
	23	43				SAT 20			S					04551			48890			ELEV 29.8			OFFSET .077					
223	00	00							DRC	121	3.5			03551			47342												
	00	15								130	4.6			02710			45940												
	00	30								135	4.3			01723			44448												
	00	45								138	4.2	-		00854			43006												
	01	00							DRC	135	4.7	+	55	59932			41604												
	01	15							DRC	121	4.5			59010			40224												
	01	30							DRC	124	4.11			58100			38847												
	01	45							DRC	121	5.-			57150			37431												
	02	00				SAT 29			DRC	134	5.0			56201			36017												
	02	15				SAT 30			DRC	139	4.3			55260			34848												
	02	30				EOL 430			DRC	131	5.6			54305			33417												

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) - 79 (YR) - WG (AREA)

Ship R.V. Sea Sounder Chief Scientist Hampton / Bouma Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ½	DEG	MINUTES	LONGITUDE ½	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or T.R.	Time ½ Pulse	SPP
223	02	35		TR		SOL TRANSIT			DRC	287	10.1	+	55	54.31	-	165	38.3											
	02	45		TR					C	279	7.7			54.60			40.7											
	03	00		TR					DRC	273	8.1			54.79			38.2			LORAN SHUT OFF TO CORRECT FAULTY SPEED READINGS								
	03	15		TR					DRC	278	7.1			54.96			41.3											
	03	30		TR					DRC	273	8.8			55.16			45.1											
	03	45		TR					DRC	276	8.0			55.36			48.9											
	03	52		TR		SAT 12			S					54.48			42.7			manual update		elev.	42.6	offset 3.145		Frq 1.005	
	04	00		TR																								
	04	15		TR					DRC	279	4.8			55.23			46.5											
	04	30		TR					DRC	279	4.8			55.44			48.9											
	04	45		TR					DRC	271	5.3			55.49			51.3											
	05	00		TR					DRC	276	5.9			55.65			53.8											
	04	36				SAT 19			S											LORAN ON AGAIN manual update		elev.	19.1	offset 1.648				
	04	52				SAT 14			S					56.00			2.3			manual update		elev.	49.4	offset 2.145				
	05	00							DRC	274	6.7			56.15			03.5											
	05	30							DRC	270	3.5			55.90			53.4											
	05	40		971		SOL 471 EOLTR			DRC	295	6.1			55.50			58.3											
	06	00		471					DRC	299	5.5			56.74			57.3											
	06	15		471					DRC	339	4.5			57.60			17.0											
	05	28		TR		SAT 12			S					56.-			16.-			elev. 50.8		Frq.	1.66	offset 1.812		manual update		
	06	30		471					DRC	317	5.2			58.92	-	154	00.74											
	06	02		471		SAT 19			S					57.7			00.1			manual update		elev.	63.9	offset .503		Frq 1.601		
	06	45							DRC	328	4.9			58.98			01.83											
	07	00								310	—																	
	07	15							DRC	318	—	+	56	59.06			05.11											
	07	30							DRC	316	—			60.17			06.04											
	07	45							DRC	315	4.5			02.11			07.22			manual speed								
	08	02							DRC	312	4.2			03.16			08.28											
	08	15							DRC	314	4.5			03.84			09.50											
	08	29				SAT 19			S					03.30			07.67			manual update		elev.	38.1	offset .850		Frq -.742		
	08	20							DRC	296	4.5			04.10			11.90											
	08	45					P		DRC	319	4.1			05.11			10.73											
	09	00				SAT 20			S					04.74			11.26			elev. 30		Frq	1.32	offset .093				

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 - 79 - WT (ID. / YR / AREA)

Ship Sea Sander Chief Scientist Hampton/Bauma Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	WIND SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Drgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TR	Time ½ min.	SPD
223	09	00		471					DRC	320	3.8	+	55	35.2	-	154	11.79											
	09	15		471					DRC	316	4.5			04.00			12.89											
	09	30		471					DRC	316	4.9			06.82			14.17											
	09	45		471					DRC	318	4.3			07.58			15.40											
	10	00		471					DRC	309	3.8			08.33			16.55											
	10	15		471					DRC	318	5.6			09.21			17.95											
	10	30		471					DRC	309	4.2			09.83			18.92											
	10	45		471					DRC	317	3.5			10.51			20.13											
	10	36		471		SAT 20			S	312	4.3			10.20			19.99			el. 66.7	offset .091			freq. -.039				
	11	00		471					DRC	314	3.6			11.27			21.33											
	11	15		471					DRC	318	3.8			12.07			22.60											
	11	30		471					DRC	319	5.7			13.15			24.32											
	11	45		471					DRC	317	5.3			14.08			25.81											
	12	00		471					DRC	319	5.1			15.01			27.35											
	12	15		471					DRC	319	4.8			15.95			28.79											
	12	30		471					DRC	318	5.1			16.86			30.43											
	12	20		471		SAT 20			S	318	4.8			16.31			29.37			el. 17.0	freq. 1.210	offset .094						
	12	39		471		EOL 471			DRC	321	4.2			17.40			31.31			line ended ≈4 mi short due to operator error								
	12	42		TR		SOL TR			DRC	241	5.4			17.45			31.71											
	12	46		TR					DRC	239	5.2			17.22			32.17											
	13	00		TR					DRC	231	5.0			16.54			33.72											
	13	15		TR					DRC	237	5.0			15.70			35.43											
	13	30		TR					DRC	233	5.3			14.86			37.23											
	13	45		TR					DRC	240	5.0			14.05			38.86											
	14	00		TR					DRC	239	5.8			13.24			40.57											
	14	15		TR					DRC	243	5.1			12.42			42.23											
	14	17		TR		EOL TR			DRC	243	5.3			12.31			42.48											
	14	20		472		SOL 472			DRC	184	6.6			12.09			42.69											
	14	30		472					DRC	125	5.8			11.41			41.72											
	14	45		472					DRC	120	4.8			10.70			40.09											
	15	00		472					DRC	136	4.7			09.89			38.60											
	15	15		472					DRC	138	5.1			08.99			37.19											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 -79- WG (ID. / YR / AREA)

Ship Sea Sounder Chief Scientist Hampton/Bouma Affiliation USGS

Date 2/75

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ±	DEG	MINUTES	LONGITUDE ±	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TD	Time ½ Mile	SPP
223	1530			472					DRC	134	4.9	+	56	0810	-	154	3565											
	1545			472					DRC	133	5.1			0726			3411											
	1600			472					DRC	128	5.1			0641			3267											
	1606			472		SAT 13			S	131	4.5			0607			3201			sh. 16.0	freq. - 087		offset .078					
	1615			472					DRC	131	5.5			0559			3111											
	1630			472					DRC	133	4.6			0480			2978											
	1645			472					DRC	123	4.2			0393			2839											
	1700									121	3.2			0314			2692											
	1715									126	4.1			0244			2572											
	1730									124	5.1			0172			2445											
	1744					SAT 19			S					0179			2499			ELEV. 29.6		OFFSET .022						
	1745								DRC	120	3.4			0093			2317											
	1800									116	6.6			0026			2187											
	1815									129	3.7	+	55	5954			2069											
	1830									128	3.8			5817			1963											
	1845									130	5.0			5900			1762											
	1900									141	3.5			5727			1631											
	1915									151	4.0			5651			1520											
	1930									142	4.6			5564			1403											
	1932			472		END LINE 472				133	4.3			5596			1460											
	1945			473		START LINE 473				060	4.8			5628			1327											
	1941			TRN		SAT 13, 14 TURN			S					5610			1422			ELEV 36.2		OFFSET .028						
	2000			473					DRC	070	4.6			5665			1188											
	2015									077	4.8			5728			0785											
	2030									058	5.3			5785			0840											
	2045									052	5.2			5869			0629											
	2050					SAT 20			S					5902			0561			ELEV. 34.5		OFFSET .024						
	2100								DRC	052	5.0			5954			0466											
	2115									052	4.9	+	56	0036			0288											
	2130									044	4.9			0116			0119											
	2145									048	4.8			0199	-	153	5955											
	2200									051	4.8			0227	-	153	5776											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) -79- (YR) WG (AREA)

Ship SEA SOUNDER Chief Scientist HAMPTON / BOUMA Affiliation USGS

Rev. 2/75

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or TB	Time ½ Rev.	SPP
223	22	15		473					DRC	055	4.7	+	56	03.52	-	153	56.31											
	22	30								054	4.6			04.31			54.27											
	22	45								055	4.6			05.07			53.49											
	22	56				SAT 20			S					04.62			54.15		ELEV.	65.4	OFFSET	.016					
	23	00							DRC	049	4.6			05.28			51.57											
	23	15								054	4.9			06.57			49.88											
	23	30								048	5.1			07.42			48.21											
	23	45								052	5.1			08.30			46.51											
224	00	00								062	5.4			09.16			44.71											
	00	15								056	5.6			10.05			42.83											
	00	30								057	5.7			10.57			40.88											
	00	22				SAT 20			S					10.49			41.81		ELEV.	17.6	OFFSET	.042					
	00	45							DRC	054	5.9			11.94			38.86											
	01	00							DRC	057	5.7			12.71			36.92											
	01	15							DRC	051	5.9			13.75			35.00											
	01	30								055	5.9			14.73			33.05											
	01	45								053	6.1			15.71			30.96											
	02	00								054	6.6			16.64			28.97											
	02	15							DRC	050	5.6			17.62			26.92											
	02	14				SAT 14			S					17.24			26.99		ELEV.	25.8	OFFSET	.024	From	.703			
	02	30							DRC	049	5.5			18.47			25.11											
	02	45							DRC	049	5.6			19.37			23.24											
	02	45				SAT 12			S					19.56			22.28		EL = 23.0		OFFSET	0.077					
	03	00							DRC	058	5.4			20.27			21.43											
	03	15							DRC	048	5.5			21.13			19.51											
	03	30							DRC	052	5.5			22.03			17.57											
	03	45		473		EQL 473			DRC	049	5.6			22.92			15.67											
	04	00		TRN		SUN TRANSIT			DRC	032	4.7			23.60			14.29											
	04	15							DRC	036	4.9			24.32			11.38											
	04	18				SAT 13			S					25.61			11.25		EL = 19.0		OFFSET =	.056	FROM	1.230			
	04	30							DRC	025	9.0			27.06			09.16											
	04	45							DRC	027	7.5			28.04			08.06											

U.S.G.S. NAVIGATION LOG

Cruise Locator S8 - 79 - WG (ID. / YR / AREA)

Rev. 2/75

Ship RV Sea Sounder Chief Scientist Hampton / Bouma Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ½	DEG	MINUTES	LONGITUDE ½	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or TD	Time ½ or ½	SPP
224	0500			TRN					DRC	037	9.4	+	56	30718	-	153	04112											
	0515									036	7.6			32061			01234											
	0530									036	11.6			33451			58607											
	0533					SAT 19			S	[illegible]	[illegible]			34199			58100			EL = 40.5	OFFSET = .047			Freq = .332				
	0545								DRC	037	10.4			26[illegible]			56028											
	0600			+ ON					DRC	042	5.9			37[illegible]			24320											
	0610			474		SOL 474 EOL TR			DRC	324	2.3			18116			22273											
	0615			C					DRC	275	5.2			28207			54416											
	0630									281	5.3			38223			56128											
	0645									287	4.0			24602			58628											
	0700									282	4.11			38932	-	153	00254											
	0715									280	4.6			39200			02216											
	0720					SAT 19			S					39111			02349			EL = 61.8	OFFSET = .234			Freq = -.214				
	0730								DRC	275	4.6			39111			34557											
	0745								DRC	271	4.6			39821			06663			•								
	0800								TR	113	5.0			40028			07104											
	0751					SAT 13			S					39715			02357			EL 31.9	OFFSET .076	manual update						
	0815								DRC	272	4.6			40021			10334											
	0830								DRC	280	4.7			40033			12339											
	0822			474		EOL 474			DRC	280	4.7			40056			12067											
	0845			TRN					DRC	284	5.0			40822			14356											
	0900			TR					DRC	107	4.9			40859			14511											
	0911				439	ON STATION 439			DRC	113	5.3			40551			12331											
	0914				439	ON BOTTOM G-1			DRC	114	2.0			40556			12559			G-1, full recovery								
	0939				439	ON BOTTOM G-2			DRC	144	0.1			40551			12301			G-2, full recovery, 217 cm recovery								
	0959				439	LV STATION			DRC	112	8.0			40446			10204											
	1015			TR					DRC	113	8.8			39964			08233											
	1028				440	ON STATION 440			DRC	132	1.0			39117			06400											
	1030				440				DRC	118	0.5			39116			06377											
	1031				440	ON BOTTOM G-1			DRC	122	0.0			39115			06366			G-1, 243 cm recovery, waiting for geo								
	1045				440				DRC	120	0.0			39115			06366											
	1052				440	LV STATION 440			DRC	068	0.8			39220			06444											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 -79 -WG (ID. / YR / AREA)

Ship R/V Sea Lander Chief Scientist Hampton/Bauma Affiliation USGS

2/78

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ½	DEG	MINUTES	LONGITUDE ½	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TD	Time ½ Rt.	SPP
224	1	00		TR					DRC	091	8.9	+	56	39 43	-	153	05 03											
	1	04			441	ON STATION 441			DRC	140	0.6			39 49			04 63											
	1	07			441	ON BOTTOM G-1			DRC	119	0.4			39 50			04 62		G-1, x210 cm recovery, used for gps										
	1	14			441	SAT 20			S	128	0.3			39 56			05 11		el. 55.8 offset .253 freq. .205										
	1	15			441				DRC	129	0.3			39 52			04 67											
	1	30			441				DRC	081	1.2			39 69			05 43											
	1	45			441				DRC	128	0.8			39 76			05 35											
	1	45			441	LV STATION 441			DRC	125	0.9			39 76			05 76											
	2	00		TR					DRC	111	7.6			39 24			02 47											
	2	03			442	ON STATION 442			DRC	122	1.0			39 16			02 18											
	2	15			442				DRC	117	0.2			39 13			02 06											
	2	18			442	ON BOTTOM 442V1			DRC	112	0.4			39 15			02 11		V1,										
	2	30			442				DRC	119	0.2			39 18			02 16											
	2	45			442				DRC	032	1.1			39 25			02 91											
	3	00			442				DRC	033	0.8			39 33			02 71											
	3	15			442				DRC	123	1.2			39 36			02 75											
	3	12			442	SAT 14			DRC	116	0.3			39 22			02 56		el. 15.0 freq. 5.458 offset .253										
	3	30			442				DRC	074	0.8			39 05			01 84											
	3	42			442	LV STATION 442			DRC	021	0.7			39 08			02 17											
	3	45		TR					DRC	109	7.5			39 10			01 93											
	4	00		TR					DRC	106	3.9			38 83	-	152	59 77											
	4	15		TR					DRC	166	3.1			38 49			57 52											
	4	21			443	ON STATION 443			DRC	108	2.0			38 61			57 74											
	4	30			443				DRC	108	0.7			38 57			57 [illegible]											
	4	32			443	ON BOTTOM V-1			DRC	097	0.7			38 56			57 [illegible]											
	4	45			443				DRC	157	0.7			38 58			57 50											
	5	00			443				DRC	087	1.2			38 71			57 95											
	5	01			443	SAT 14			S	097	1.1			38 94			59 05		el. 54.0 offset .639 freq. .898										
	5	15			443				DRC	105	0.6			38 92			58 94											
	5	25			443	LV STATION 443			DRC	119	1.2			38 95			59 32											
	5	30		TR					DRC	214	8.7			38 63			59 54											
	5	45		TR					DRC	211	8.3			37 15	-	153	01 15											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 - 79 - WG (ID. / YR / AREA)

Ship R/V Alla Saunder Chief Scientist Nampton/Bouma Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ½	DEG	MINUTES	LONGITUDE ½	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angle	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TA	Time ½ Min	SPP
209	1600			TR					DRC	211	7.3	+	56	3566	-	153	0278											
	1615			TR					DRC	211	7.1			3414			0442											
	1630			TR					DRC	210	7.3			3258			0607											
	1634			TR		SAT 19			DRC	210	7.3			3227			0708			el. 18.5	offset	.367	frq. - .512					
	1645			TR					DRC	207	8.0			3103			0808											
	1700			TR					DRC	203	8.0			0922			0967											
	1715								DRC	209	9.2			2749			1113											
	1730									207	10.4			2527			1333											
	1745									195	10.1			2302			1563											
	1747			TR		END TRANSIT				145	2.3			2277			1575											
	1800				444	ON STA 444				113	.2			2292			1582											
	1802				449	ON BOTTOM				113	1.1			2291			1575											
	1814				444	LEAVE STA 444				127	0.5			2281			1542											
	1816			TR		START TRANSIT				181	7.2			2269			1539											
	1822					SAT 19			S					2203			1589			ELEV	68.0	offset:	.180					
	1830								DRC	188	9.4			2075			1648											
	1845								DRC	187	8.7			1867			1737											
	1852					SAT 13			S					1759			1764			ELEV	61.0	offset	.028					
	1900								DRC	181	8.9			1650			1783											
	1915									183	7.9			1446			1799											
	1930									176	7.2			1247			1801											
	1941			TR		END TRANSIT				132	5.4			1132			1757											
	1945				445	STATION 445				141	0.8			1103			1721											
	2000				445					118	0.5			1110			1715											
	2008				445	ON BOTTOM				125	0.1			1117			1728											
	2015				445					127	0.3			1116			1726											
	2018				445	SAT 19			S					1118			1725			ELEV	32.5	offset	.017					
	2030				445				DRC	132	0.3			1111			1710											
	2034				445	END STA 445				134	0.3			1109			1707											
	2035			TR		START TRANSIT				254	9.4			1084			1753											
	2038					SAT 13			S					1125			1735			ELEV	16.7	offset	.401					
	2100								DRC	251	9.2			1048			2326											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) -79 (YR) -W6 (AREA)

2/75

Ship SEA SOUNDER Chief Scientist HAMPTON/ADAMS Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ½	DEG	MINUTES	LONGITUDE ½	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TA	Time ½ Min.	SPP
224	21	15		TR					DRC	254	9.1	+	56	09.92	-	153	27.28											
	21	30							DRC	252	8.9			09.30			31.19											
	21	28				START 20			S					09.03			30.95			ELEV. 59.4		OFFSET	.324					
	21	45							DRC	254	9.5			08.41			35.22											
	22	00								255	8.8			07.89			39.15											
	22	15								250	9.4			07.33			43.06											
	22	30								250	8.8			06.80			47.03											
	22	45								254	7.4			06.09			50.87											
	22	48		TR		END TRANSIT				135	1.9			05.92			51.50											
	22	49			446	ON STATION 446				107	2.0			05.92			51.49											
	22	57			446	ON BOTTOM				105	0.0			05.88			51.49			V+1								
	23	00			446					112	0.3			05.87			51.48											
	23	15			446					132	1.3			05.76			51.70											
	23	23			446	END STA 446				146	1.5			06.03			52.03											
	23	14			446	START 20			S					06.09			52.13			ELEV. 38.6		OFFSET	.284					
	23	30		TR		START TRANSIT				024	7.1			06.29			52.43											
	23	45								001	8.6			08.11			52.27											
225	00	00								001	10.3			10.50			52.08											
	00	15								000	9.3			13.29			51.90											
	00	30								005	8.8			15.53			51.70											
	00	45		V						007	10.0			17.96			51.59											
	01	00		TR						016	09.0			20.62			51.47											
	01	06			447	ON STATION 447								21.71			50.96											
	01	12			447	ON BOTTOM 51								22.68			50.84											
	01	38			447	OFF STATION				069	05.4			30.76			50.65											
	02	00		TR						276	7.7			24.24			51.81											
	02	15								276	9.1			26.44			52.71											
	02	30								275	9.2			27.70			00.51											
	02	45								280	11.4			29.15			01.20											
	03	00								281	9.3			32.30			02.28											
	03	15								286	11.0			34.05			03.24											
	03	30								293	5.9			23.27			15.29											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 -79- 06 (ID. / YR / AREA)

Ship SEA SOUNDER Chief Scientist Hampton/Bourne Affiliation U. S. G. S

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ±	DEG	MINUTES	LONGITUDE ±	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TA	Time ½ Min	SPP
224	03	44			448	ON STATION			DRC	279		+	15	23.24	-	1	54.18											
	03	46			448	ON BOTTOM S1			DRC					23.19			54.18											
	03	52			448	OFF STATION			DRC	178				23.13			54.17											
	04	00		TOW					DMC	178	7.6			22.20			54.13											
	04	30							DRC	181	7.7			17.97			53.57											
	05	00							DRC	176	8.4			14.00			52.53											
	04	45				SAT 19			S					16.07			52.21			EL = 22.8		OFFSET = .941						
	05	14		W		SAT 13			S					18.81			49.86			EL = 37.4		OFFSET = .085						
	05	30		TOW					DRC	161	6.8			09.65			49.31											
	06	56			449	ON STATION			DMC					08.28			47.71											
	05	58			449	ON BOTTOM			DRC					08.13			47.33											
	06	13			449	OFF STATION			DRC	175				08.13			46.31											
	06	30		TOW					DRC	176	10.1			05.32			45.68											
	07	01				SAT 13			S					00.50			44.94			EL = 58.7°		OFFSET = -.454						
	07	15							DRC	151	7.7	+	05	58.48			44.64											
	07	30							DMC	147	7.5			56.54			43.92											
	08	00								011	1.5			56.21			43.83											
	08	15								201	1.5			56.18			43.47											
	08	16				SAT 19			S					54.98			41.61			E 31.4 manual speed		OFF: .437		Rate = -6.093			manual update	
	08	20							DRC	162	1.6			54.46			39.91											
	08	45								330	5.0			51.14			45.11											
	06	00			450	ON STATION				067	2.6			51.17			44.59											
	07	01			450	ON BOTTOM GI				021	0.1			56.06			41.13											
	07	15			450					060	.7			56.17			41.11			bridge Loran fix about 4 miles west of oyster pt.								
	09	22			450	LV STATION 450			DRC	120	0.6			56.28			41.23											
	09	30		TR					DRC	270	6.4			56.33			41.52											
	09	45		TR					DRC	269	9.4			56.34			41.54											
	10	00		TR					DRC	270	10.4			56.63			42.21											
	10	15		TR					DRC	271	10.0			56.86			42.80											
	10	30		TR					DRC	265	9.8			56.96			43.29											
	10	45		TR					DRC	266	10.0			56.80			43.72											
	11	00		TR					DRC	281	3.4			56.72			44.18											

U.S.G.S. NAVIGATION LOG

Cruise Locator 18 (ID.) - 79 (YR) - WG (AREA)

Ship Sea Sounder Chief Scientist Hampton/Bouma Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dr. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or T.D.	Time ½	SPD
225	11	02			451	ON STATION 451			DRC	191	0.0	+	65	5673	-	154	4183											
	11	11			451	ON BOTTOM S-1			DRC	142	0.7			5681			4188											
	11	15			451				DRC	174	0.8			5685			4191											
	11	30			451				DRC	256	0.8			5701			4211			waiting for SAT 20 for position								
	11	45			151				DRC	238	0.9			5719			4234											
	11	52			451	SAT 20			B	263	0.9			5814			4592			ll. 22.2 offset 2.132 freq. -097								
	11	20			451	BRIDGE FIX LC			LC					5815			4158			Loran fix, 451, S2 probably taken closer to this pt, time approx.								
	12	00			451				DRC	267	0.9			5757			4259											
	12	05			451	LV STATION 451			DRC	276	0.8			5832			4606											
	12	15		TR					DRC	277	10.0			5843			4852											
	11	50			451	BRIDGE FIX LC			LC					5841			4611			Loran C AR								
	12	30		TR					DRC	279	10.0			5855			5300											
	12	45		TR					DRC	282	9.9			5879			5736											
	13	00		TR					DRC	280	9.9			5951	-	155	0169											
	13	15		TR					DRC	269	9.1	+	56	0007			0612											
	13	29			452	ON STATION 452			DRC	110	0.7	+	55	5998			0714											
	13	27			452	ON BOTTOM S-1			DRC	119	0.7			5997			0708			S-1								
	13	30			452				DRC	105	0.5	+	56	0000			0708											
	13	45			452				DRC	156	0.9			0034			0706											
	13	57			452	LV STATION 452			DRC	176	1.0			0040			0705											
	14	00		TR					DRC	353	9.2			0171			0722											
	14	15		TR					DRC	354	9.8			0431			0769											
	14	30		TR					DRC	354	9.9			0683			0794											
	14	45		TR					DRC	349	9.7			0927			0809											
	15	00		TR					DRC	348	8.8			1145			0841											
	15	15		TR					DRC	336	9.2			1346			0918											
	15	25			453	ON STATION 453			DRC	312	1.0			1414			0971											
	15	27			453	ON BOTTOM S-1			DRC	311	1.0			1417			0977			S-1, very little recovery								
	15	30			453				DRC	282	1.0			1418			0982											
	15	36			453	ON BOTTOM S-2			DRC	232	1.8			1411			0984			S-2								
	15	43			453	SAT 12			B	204	2.6			1396			0895			ll. 43.3 offset .386 freq. 605 NOAA								
	15	53			453	LV STATION 453			DRC	115	2.4			1363			0851											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 - 79 - WG (ID. / YR / AREA)

Ship Sea Sounder Chief Scientist Hampton/Bouma Affiliation USGS

Next STA 459 LINE 475

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Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or TR	Time ¾ Min	SPD
22	16	00		TR					DRC	092	9.9	+	56	13 37	-	155	06 80												
	16	15		TR					DRC	092	9.7			12 31			02 41												
	16	15		TR		SAT 13			5	093	9.7			12 76		V	02 23			el. 19.4	offset .081			freq. .175				
	16	30		TR					DRC	092	9.9			12 12	-	154	57 96											
	16	45		TR					DRC	087	9.4			11 76			53 78											
	17	00								085	7.4			11 52			49 50											
	17	15								087	8.9			11 58			45 48											
	17	25		TR		END TRANSIT				078	7.8			12 05			43 18											
	17	30			454	ON STATION				070	0.5			12 07			42 80											
	17	29				SAT 12			S					11 98			42 96			ELEV 44.3	OFFSET .115							
	17	32			454	ON BOTTOM			DRC	078	0.5			12 08			42 77			V-2								
	17	45			454					095	0.2			12 00			42 92											
	18	00			454					090	0.2			12 05			42 77											
	18	30			454					089	0.3			12 13			42 51											
	18	45			454					102	0.3			12 12			42 44											
	18	55			454	END STATION 454				086	0.1			12 14			42 44											
	19	00		TR		START TRANSIT				155	1.8			12 13			42 47											
	19	15								174	8.5			10 20			42 20											
	19	37				SAT NAV OFF				175	8.2			07 17			42 43			SAT-NAV OFF FOR MEMORY PATCH !!!								
	19	46				SAT NAV ON				—	—			—			—			SAT-NAV ON - WAIT FOR SAT PASS IN PROGRESS								
	19	49				SAT 13			S					05 57			42 82			ELEV 30.5	OFFSET .805							
	20	15							DRC	175	8.9			02 27			42 02											
	20	30							DRC	181	8.1			00 23			42 00											
	20	22				SAT 20			S					09 07			41 95			ELEV 25.8	OFFSET .240							
	20	45							DRC	170	5.0	+	55	58 41			42 08											
	21	00								169	4.9			57 14			41 91											
	21	03		TR		END TRANSIT				172	4.7			56 88			41 87											
	21	40		475		START LINE 475				323	5.0			56 88			42 46											
	21	05		—		SAT 19			S					56 76			41 73			ELEV 16.4	OFFSET .125							
	21	15		475					DRC	331	5.4			37 27			42 87											
	21	30		—						317	5.5			58 30			44 36											
	21	45							V	317	5.3			59 34			45 73											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 - 79 - WG (ID. / YR / AREA)

Ship SEA SOUNDER Chief Scientist Hampton/Benoa Affiliation USGS

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Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	WIND SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Dirge	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or TR	Time ½ min	SPP
225	22	00		475					DRC	325	5.1	+	56	00.29	-	154	47.55											
	22	15								317	5.0			01.25			48.79											
	22	30								318	5.8			02.24			50.68											
	22	45								324	5.3			03.20			52.13											
	23	00								323	5.4			04.20			53.28											
	23	15								322	5.0			05.27			55.44											
	23	30								319	5.9			06.26			57.07											
	23	45								315	6.0			07.49			58.28											
226	00	00								317	6.8			08.80	-	155	01.01											
226	23	52				SAT 20			S					08.22			00.87	E	6V	24.3	OFFSET	.466						
226	00	15							DRC	332	6.8			10.21			03.66											
	00	30								302	5.4			11.38			05.20											
	00	45								303	5.3			12.57			06.55											
	01	00								297	5.0			13.80			08.17											
	01	10		475		EOL 475				301	4.9			13.92			09.36											
	01	15		476		SOL 476				331	3.3			14.07			09.86											
	01	30								315	3.6			13.68			11.06											
	01	45								294	4.7			12.93			12.34											
	02	00								294	4.8			12.21			13.97											
	02	15							DRC	294	4.8			11.44			15.61											
	02	17				SAT 14			S					11.51			15.81			EL = 23.1	OFFSET = .208		Freq = .136					
	02	30							DRC	295	4.7			10.87			17.16											
	02	45							DRC	296	4.8			10.19			18.70											
	02	47				SAT 12			S					10.23			18.87			EL = 21.7	OFFSET = 0.047							
	03	00							DRC	232	4.9			09.96			20.21											
	03	08		476		EOL 476			DRC	231	4.9			08.94			20.78											
	03	11		477		SOL 477			DRC	137	3.8			08.56			20.86											
	01	15		477						140	5.6			08.21			20.91											
	03	00								143	4.9			07.41			18.84											
	03	15								150	4.9			06.49			17.26			LORAN FIXES GIVE SPEED AVG: 4.6								
	03	00								147	5.1			05.53			15.56											
226	04	15		477					DRC	146	5.0			04.50			14.21											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) - 79 (YR) - WG (AREA)

Date 2/75

Ship Sea Sounder Chief Scientist Hampton/Baumer Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE +/-	DEG	MINUTES	LONGITUDE +/-	DEG	MINUTES	WIND Dir.	WIND SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Dirgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TD or TR	Time +/- Min	SPP
226	04	30		477					DRC	135	5.5	+	56	33.53	-	155	12.75											
	04	26				SAT 113			S					03.70			13.14			EL = 20.8		OFFSET = .037		Freq = .625				
	04	45							DRC	140	5.3			02.53			11.02											
	05	00							DRC	143	5.2			01.58			09.33											
	05	15							DRC	162	4.9			00.58			08.12											
	05	30							DRC	146	5.0	+	55	59.51			06.81											
	05	42				SAT 119			S					58.78			05.13			EL = 93.7°		offset 0.050						
	05	45							DRC	124	5.2			58.64			05.05											
	06	00							DRC	190	5.1			59.64			03.23											
	06	15							DRC	136	5.1			56.72			01.68											
	06	30							DRC	139	4.6			55.85			00.40											
	06	45							DRC	140	5.2			54.74	-	154	58.88											
	07	00							DRC	131	5.1			52.77			57.39											
	07	15							DRC	145	5.1			52.99			55.95											
	07	30							DRC	139	4.9			52.06			54.47											
	07	28				SAT 119			S					51.97			54.91			EL = 54.9		OFFSET = .184		Freq = .361				
	07	42		477		EOL 477			DRC	137	4.5			50.26			53.14											
	07	45							DRC	089	4.6			51.16			52.77											
	07	47		478		SOL 478			DRC	050	4.3			51.28			52.51											
	08	00		478					DRC	028	4.6			51.98			51.49											
	08	15							DRC	051	4.9			52.74			50.06											
	08	30							DRC	045	4.6			53.50			48.37											
	08	45							DRC	047	4.8			54.28			46.09											
	09	00							DRC	053	4.9			55.10			45.17											
	09	00				SAT 120			S	053	5.0			55.09			45.11			el. 37.7		freq .117		offset .082				
	09	15							DRC	044	4.9			56.88			43.44											
	09	17				SAT 119			S	046	4.9			56.04			43.23			el. 15.3		freq. -.097		offset .033				
	09	30							DRC	041	5.0			56.76			41.81											
	09	45							DRC	047	4.9			57.56			40.15											
	10	00							DRC	053	5.0			58.37			38.55											
	10	15							DRC	045	5.4			59.18			36.92											

U.S.G.S. NAVIGATION LOG

Cruise Locator 18 - 79 - WB (ID. / YR / AREA)

Rev. 2/75

Ship Ida Lavender Chief Scientist Hampton/Bowma Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE %	DEG	MINUTES	LONGITUDE %	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TD	Time ½ Lo.	SPP
A26	10	30		478					DRC	048	5.2	+	15	00.06	-	1	35.06											
	10	45		478					DRC	053	5.0			00.93			33.38											
	10	16		478		SAT 20			S	054	5.0			00.98			33.40			el. 50.4	freq. .330		offset .051					
	11	00		478					DRC	052	5.1			01.75			31.74											
	11	15		478					DRC	058	5.8			02.58			30.00											
	11	30		478					DRC	050	5.6			03.46			28.15											
	11	45		478					DRC	056	5.8			04.40			26.23											
	12	00		478					DRC	058	5.8			05.34			24.31											
	12	15		478					DRC	063	5.8			06.30			22.36											
	12	30		478					DRC	060	5.7			07.20			20.46											
	12	45		478					DRC	058	5.7			08.12			18.51											
	13	00		478					DRC	054	5.9			09.10			16.57											
	13	15		478					DRC	052	5.5			09.97			14.68											
	13	30		478					DRC	048	5.5			10.89			12.84											
	13	45		478					DRC	047	5.4			11.77			11.01											
	14	00		478					DRC	048	5.3			12.64			09.25											
	14	15		478					DRC	047	5.1			13.45			07.44											
	14	30		478					DRC	043	5.2			14.33			05.71											
	14	45		478					DRC	053	5.2			15.20			03.99											
	14	46		478		SAT 12			S	054	5.1			15.35			03.52			el. 26.5	freq. .468		offset .042					
	15	00		476					DRC	049	5.1			15.99			02.16											
	15	15		478					DRC	050	5.1			16.86			00.87											
	15	04		478		SAT 14			S	050	5.2			16.37			01.62			el. 58.9	freq. .097		offset .027					
	15	30		478					DRC	051	5.0			17.68	-	1	58.73											
	15	45		478					DRC	050	5.2			18.54			56.95											
	16	00		478					DRC	053	5.1			19.39			55.22											
	16	15		478					DRC	053	5.2			20.25			53.46											
	16	30		478					DRC	054	5.1			21.07			51.69											
	16	45		478					DRC	054	5.2			21.89			49.90											
	17	00		478					DRC	051	5.1			22.73			48.14											
	16	50		478		SAT 14			S								49.13											
	17	15		478					DRC	052	5.2			23.55			46.39											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 (ID.) - 79 (YR) - WG (AREA)

Ship Sea Sounder Chief Scientist Hampton/Bouma Affiliation U.S.G.S.

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ½	DEG	MINUTES	LONGITUDE ½	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angles	Dirgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or T.R.	Time ½ Min.	SPP
226	17	14		478		SAT 13			S			+	56	23 51	-	153	46 55			ELEV: 44		OFFSET	.017					
	17	30							DRC	056	5.2			24 42			44 69											
	17	45								055	5.2			25 24			42 85											
	18	00								037	3.3			26 11			41 05											
	18	15								056	6.0			27 15			39 12											
	18	30							V	053	5.3			27 91			37 19											
	18	21				SAT 12			S					27 34			38 35			ELEV: 21.3		OFFSET	.087					
	18	45							DRC	050	5.1			28 68			35 47											
	19	00							DRC	048	5.3			29 59			33 72											
	19	00				SAT 13			S					29 67			33 76			ELEV 50.4								
	19	15							DRC	048	5.2			30 42			32 04											
	19	30								053	5.3			31 25			30 18											
	19	45		478		END LINE 478				053	5.4			32 08			28 32											
	19	55		479		START LINE 479				140	9.9			32 12			26 89											
	20	00								137	5.2			31 78			26 43											
	20	15								158	5.8			30 58			25 12											
	20	30								132	5.5			29 43			23 96											
	20	17				SAT 19			S					30 42			25 11			ELEV 26.9		OFFSET	.069					
	20	45							DRC	139	6.3			28 35			21 96											
	21	00							DRC	137	6.2			27 13			20 19											
	21	00				SAT 20			S					27 13			20 12			ELEV 46.0		OFFSET	.031					
	21	15								195	6.1			25 96			18 40											
	21	30								143	5.9			24 85			16 66											
	21	45								140	5.7			23 78			14 96											
	22	00								142	5.7			22 69			13 33											
	22	15								142	5.7			21 64			11 74											
	22	30								140	5.3			20 60			10 08											
	22	45								134	7.0			19 43			08 35											
	23	00								135	5.6			18 35			06 63											
	23	15								130	5.4			17 46			05 27											
	23	30								139	5.5			16 42			03 63											
	23	45								144	4.5			15 48			02 13											

U.S.G.S. NAVIGATION LOG

Cruise Locator 58 - 79 - W6 (ID. / YR / AREA)

D. ∠ 2/75

Ship Sea Sounder Chief Scientist HAMPTON/BOUMA Affiliation USGS

Julian Day	GMT TIME HR	MIN	SEC	LINE NO.	STATION NO.	COMMENTS	Fix Quality	Dir. Code	Fix Type	New Course	New Speed	LATITUDE ½	DEG	MINUTES	LONGITUDE ½	DEG	MINUTES	WIND Dir.	SPD	VISUAL, RADAR, ETC. OBJECT	Angle	Brgs	Distance	LORAN, RAYDIST, etc. Rate	Reading	TS or TR	Time ½ min	SPP
227	00	00		479					DRC	136	5.4	+	56	14946	-	153	00062											
	00	15		—						137	4.9			13947	-	152	59113											
	00	30		6						127	6.6			12936			57945											
	00	45		479		END LINE 479				138	4.9			11941			55572											
	01	00		RR	~~455~~					127	2.8			10886			55098											
	01	15		RR						314	9.5			11067			56332											
	01	25			455	ON STATION				161	0.8			12948			57270											
	01	30			455					166	1.0			12941			57269											
	01	45			455					082	1.0			12940			58227											
	01	48			455	ON BOTTOM				080	1.2			12944			58236											
	02	00			455					125	0.7			12953			58244											
	02	15			455	END STATION				166	1.9			12946			58240											
227	18	00				ARR KODIAK																						
						FINIS																						

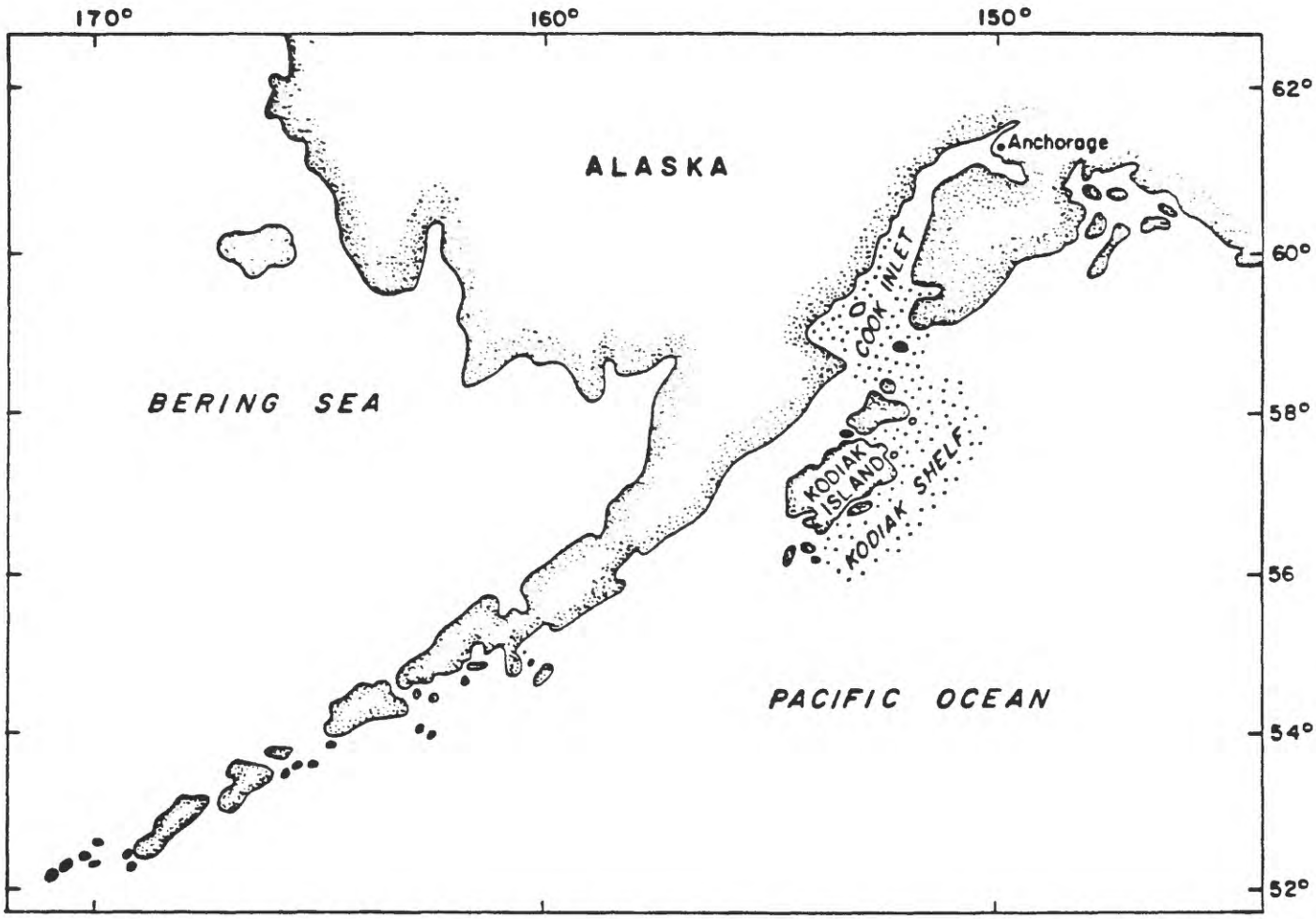

Figure 1.- Generalized location map of the study area

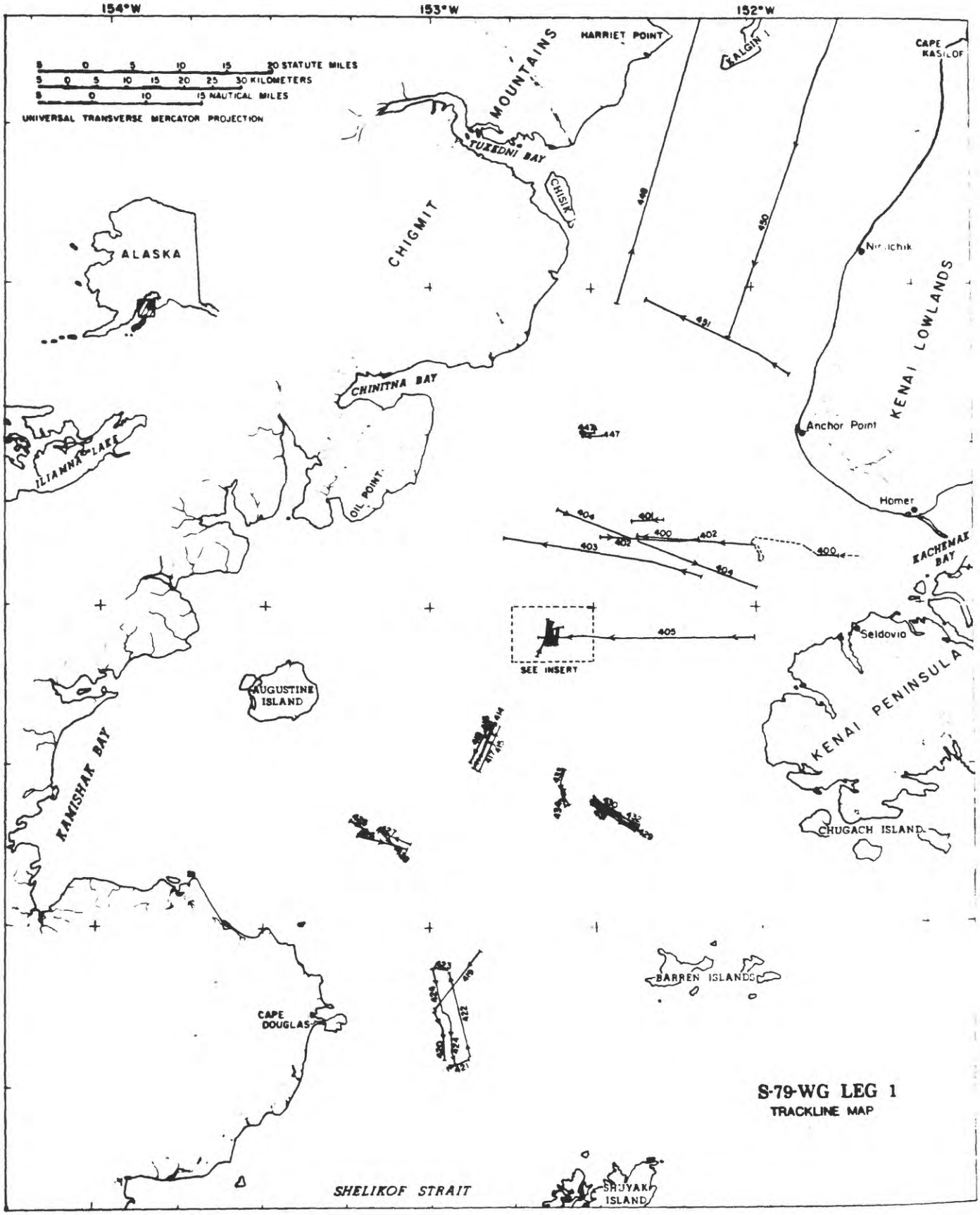

Fig. 2. Tracklines, S8-79-WG, lower Cook Inlet

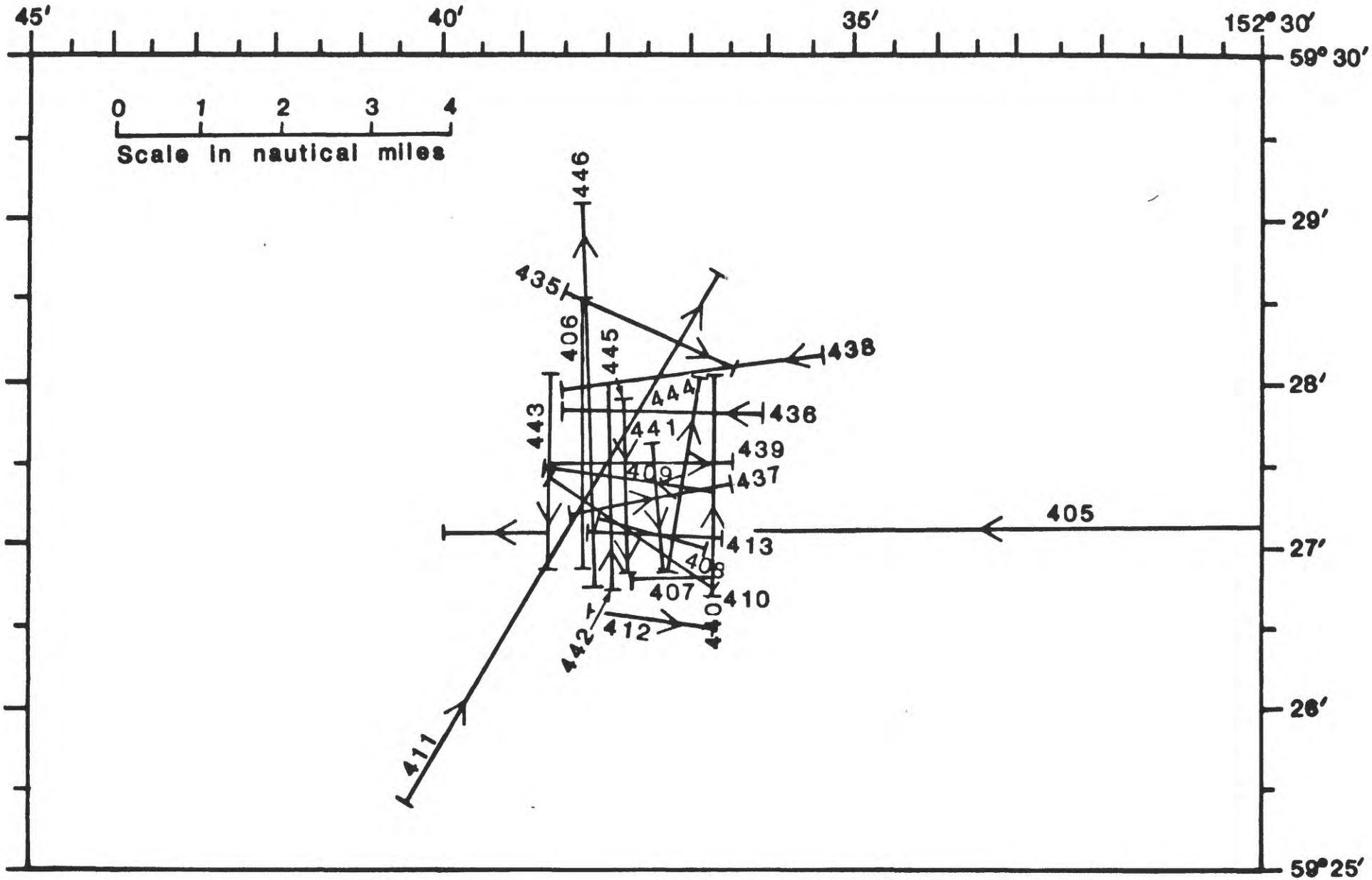
45′
40′
35′
152° 30′
59° 30′
29′
28′
27′
26′
59° 25′
0 1 2 3 4
Scale in nautical miles
446
435
406
445
438
444
436
443
441
439
409
437
405
413
408
407
410
442
412
411

Fig.2. (Insert)

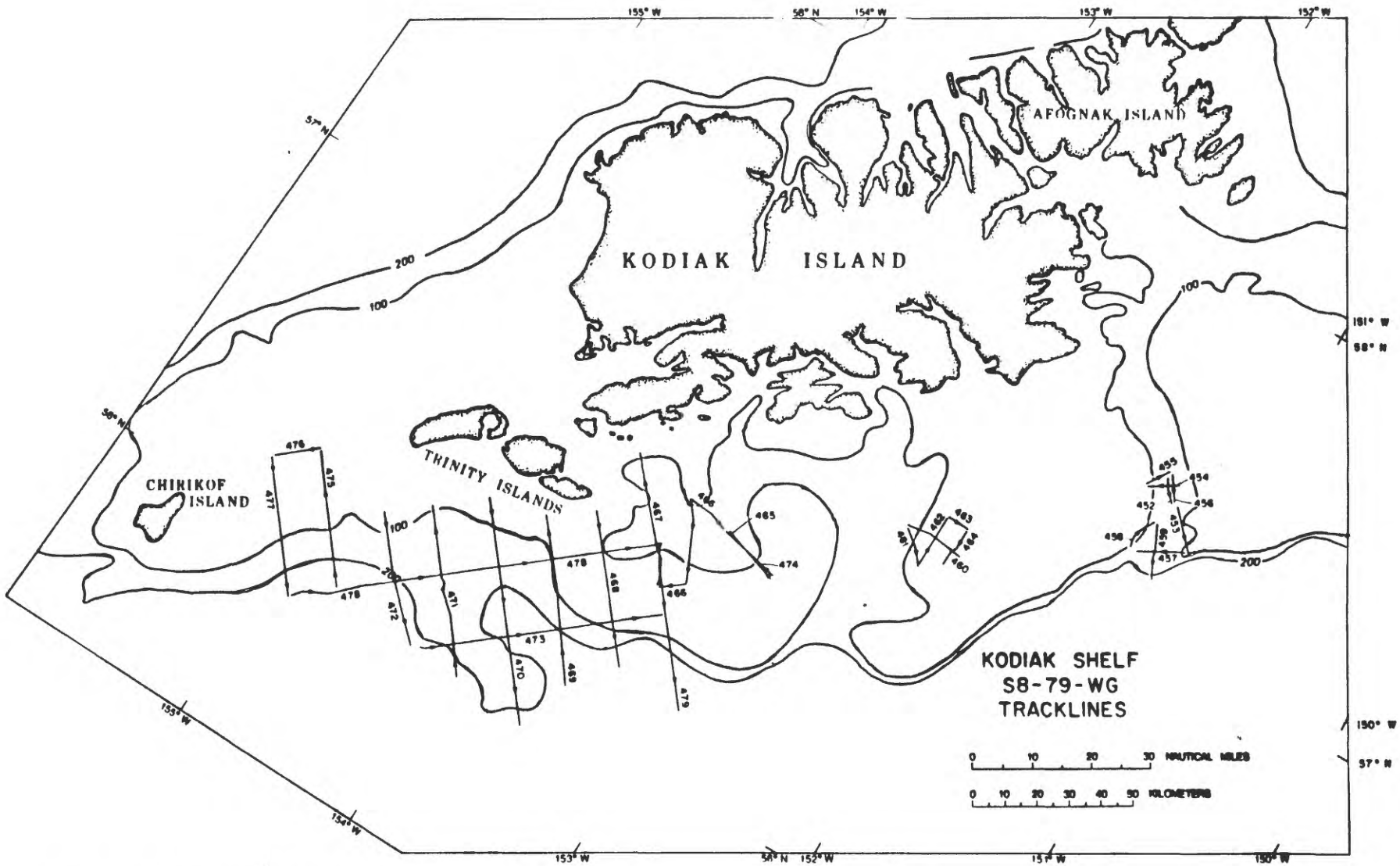

Fig. 3. Tracklines, S8-79-WG, Kodiak Shelf

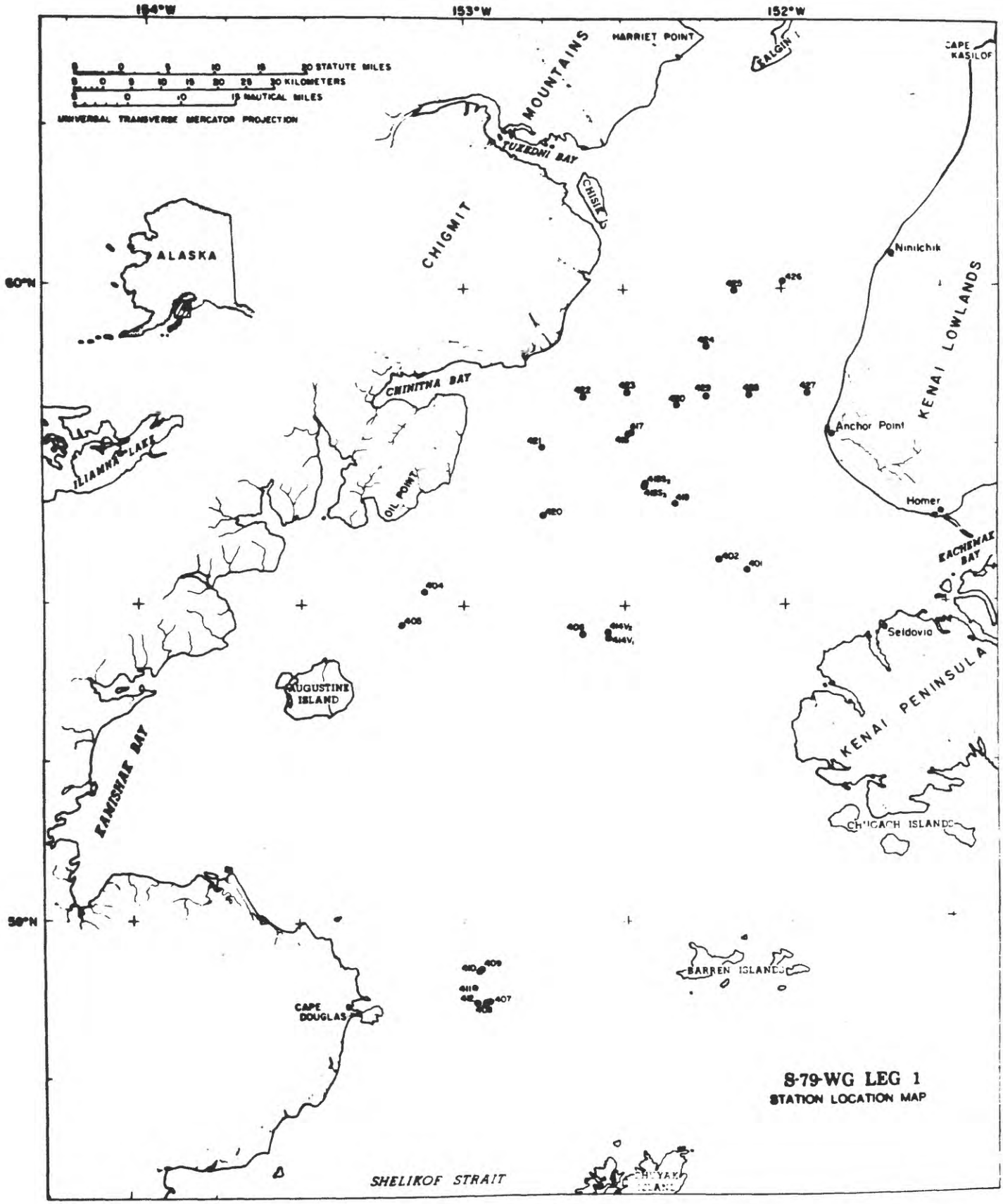

Fig. 4. Station locations, S8-79-WG, lower Cook Inlet

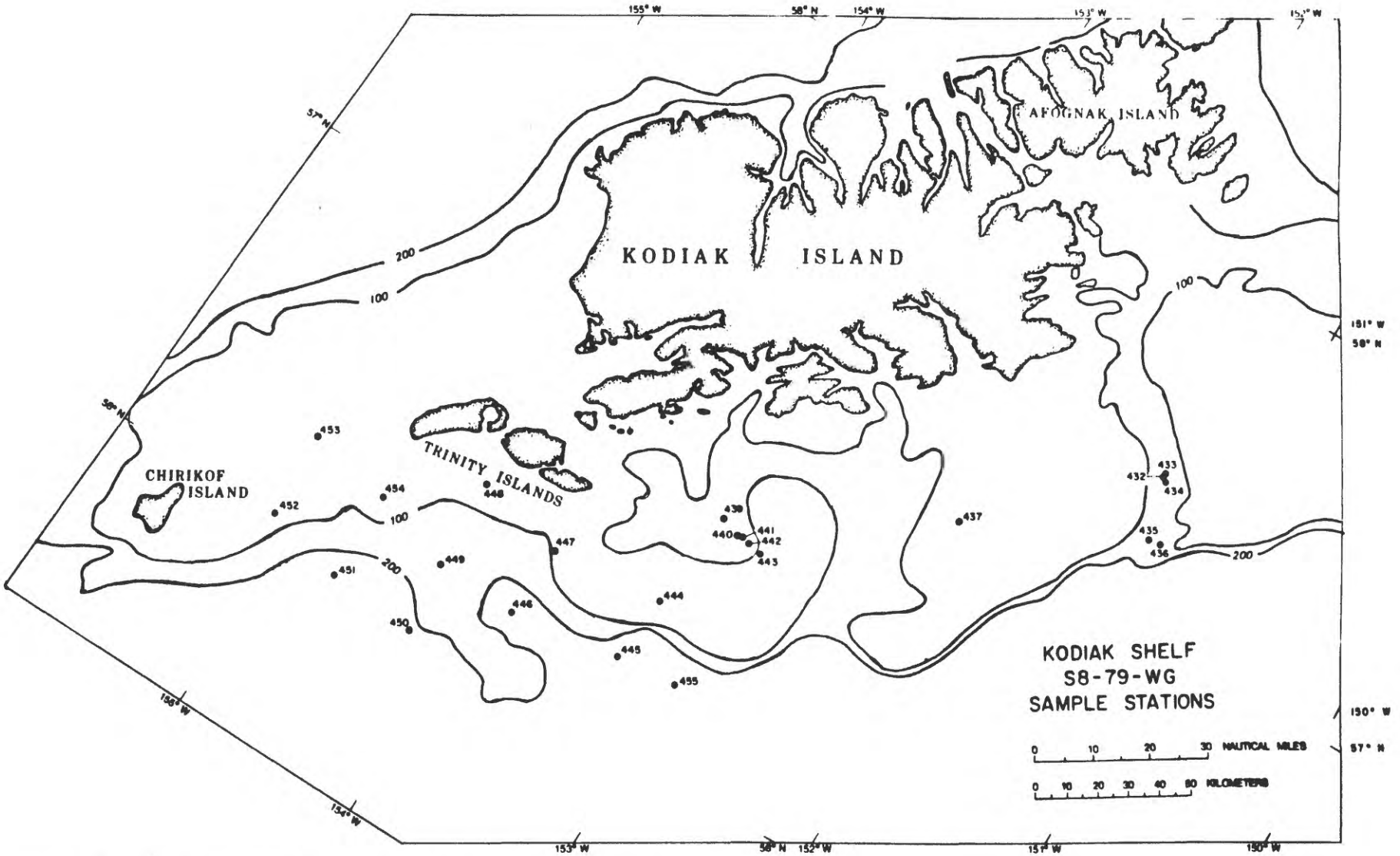

Fig. 6. Station locations, S8-79-WG, Kodiak Shelf