

CRUISE REPORT

NOAA Ship: MILLER FREEMAN
Cruise No: MF 96-13 (FOCI 10MF96)
Area: Eastern Bering Sea Shelf
Itinerary: Sept. 4, Dutch Harbor
Sept. 16, St. Paul

Participating Organizations: NOAA Alaska Fisheries Science
Center (AFSC)
NOAA Pacific Marine Environmental
Laboratory (PMEL)

Cruise Description and Objectives

Fisheries Oceanography Coordinated Investigations (FOCI) is a joint effort by scientists at PMEL and AFSC to understand the biological and physical processes which cause variability of recruitment to commercially valuable fish and shellfish stocks in Alaskan waters. The Bering Sea FOCI program is presently studying the effects of the biotic and abiotic environment on the early life stages of walleye pollock spawned in the Eastern Bering Sea. There are two aspects to the study: the acquisition and analysis of time-series data, and specific research topics to be covered on a cruise-by-cruise basis.

The objectives of this cruise were (1) to continue acquisition of long-term biological and physical time series; (2) to conduct an acoustic and trawl survey of juvenile walleye pollock for examining horizontal distributions in relation to hydrographic fronts; (3) to collect samples of juvenile pollock for studies on growth, feeding and pathology; (4) to examine vertical distribution of juvenile pollock and zooplankton using nets, and acoustics (5) to examine the impact of midwater and demersal predators upon juvenile pollock; (6) to examine distribution and feeding of seabird and marine mammal predators in the vicinity of the Pribilof Islands.

PERSONNEL

Richard Brodeur	Fishery Biologist	NOAA/AFSC
Jeffrey Napp	Oceanographer	NOAA/AFSC
Matthew Wilson	Fishery Biologist	NOAA/AFSC
Lisa Britt	Oceanographer	NOAA/AFSC
Frank Morado	Fishery Biologist	NOAA/AFSC
William Rugen	Fishery Biologist	NOAA/AFSC
Debbie Blood	Fishery Biologist	NOAA/AFSC
Destry Wion	Oceanographer	NOAA/AFSC
Robert Schabetsberger	Fishery Biologist	NOAA/AFSC
Carol DeWitt	Oceanographer	NOAA/PMEL
Tabitha Collins	Marine Mammalogist	NOAA/NMML
Libby Logerwell	Ornithologist	UC/Irvine

OPERATIONS SUMMARY

<u>Operation</u>	<u>Total</u>
CTD casts	43
Bongo tows	6
MOCNESS tows	21
Methot trawls	28
Clarke-Bumpus tows	28
Anchovy trawls	27
Bottom trawls	16
Acoustic Transects surveyed	15
Chlorophyll samples	244
Fish Predator samples collected	935
Juvenile pollock stomach samples	2917
Juvenile pollock otolith samples	2885
Adult predator length measurements	1269
Juvenile pollock length measurements	5706
Pathology collections	1075
Marine bird and mammal prey collections	70
Stable isotope collections	47

Summary of Cruise

The *Miller Freeman* departed Dutch Harbor on 4 September to begin work around St. George Island. We first conducted CTD transects on Line D and day and night acoustic transects together with plankton and juvenile fish collections (Fig. 1). We repeated sampling at stations at and on each side of the front using a Methot and anchovy trawl, and MOCNESS, and at selected locations with a bottom trawl. We conducted complete CTD sections, day and night acoustic transects, and fish and plankton sampling along Lines C, B, and A. We next conducted a 48 hour diel study at one location at the front on Line A to examine diel variability at a single location. We returned to Line C to conduct one more daytime acoustic transect and make marine bird and mammal counts. We planned to make bird collections at the end of this transect but the counts were insufficient to warrant small boat operations.

Preliminary Cruise Results

Age-0 pollock were the dominant fish caught in midwater trawls although gelatinous zooplankton dominated the catches by weight. Age-0 pollock were in almost every anchovy trawl and also in most of the Methot trawls. Age-0 pollock abundances were highest in the frontal region of all transects and were higher at the transects north of the islands. Some age-1 and adult pollock were caught in the bottom trawl but flatfishes (rock sole and arrowtooth flounder) were the most abundant fishes caught.

ACKNOWLEDGEMENTS

We would like to express our thanks and appreciation to Captain John Clary and crew of the *Miller Freeman* for an enjoyable and successful cruise. We were very impressed by the cooperativeness and positive attitude of everyone, from the steward's department to the deck crew, survey department and officers.

Table 1 MF96-13 CRUISE SUMMARY
FOCI CRUISE 10MF96

4-16 SEP 1996

Date (GMT)	Time (GMT)	Station	Haul	FOCI Grid No.	Alternate Station No.	Depth (m)	Latitude N	Longitude W	Gear	Samples Collected	Haul Comments
5-Sep	13:28	1	1	D1	CTD001	256	56° 16.51'	169° 26.42'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6
5-Sep	15:00	2	1	D2	CTD002	138	56° 21.11'	169° 27.55'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6
5-Sep	16:00	3	1	D3	CTD003	121	56° 24.17'	169° 27.35'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6; 30 m bottle did not trip
5-Sep	17:06	4	1	D4	CTD004	97	56° 27.47'	169° 28.17'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6
5-Sep	17:49	5	1	D5	CTD005	86	56° 30.02'	169° 28.52'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6
5-Sep	18:35	6	1	D6	CTD006	75	56° 32.04'	169° 29.06'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6
5-Sep	19:43	7	1	D5	CTD007	85	56° 30.06'	169° 28.23'	CTD	CHLAM,CTD,Fluor,PAR	day; TAPS6; check to see if spiky readings are due to due to TAPS unit check to see if TAPS unit is causing spiky ctd data; unit off
5-Sep	20:02	7	2	D5	CTD07B	85	56° 30.19'	169° 28.16'	CTD	CHLAM,CTD,Fluor,PAR	day; TAPS6
5-Sep	21:05	8	1	D7	CTD008	53	56° 33.43'	169° 29.08'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; line D start
5-Sep	21:26	9	1			63	56° 33.09'	169° 27.95'	Trans	EK500,SSF,TSG	day; line D end
5-Sep	23:00	9	2			233	56° 17.00'	169° 26.53'	Trans	EK500,SSF,TSG	
6-Sep	1:20	10	1		MBT001	130	56° 22.20'	169° 28.22'	Ancho	J-Gut,J-Length,J-Oto	day; jelly weight/bell diameter
6-Sep	11:28	11	1			60	56° 33.07'	169° 27.99'	Trans	EK500,SSF,TSG	night; line D start
6-Sep	13:14	11	2			203	56° 17.52'	169° 25.96'	Trans	EK500,SSF,TSG	night; line D end
6-Sep	14:52	12	1	D2	MBT002	139	56° 21.05'	169° 27.50'	LG-CB	QTowF	night; jelly weight/bell diameter; scanmar used to determine depth
6-Sep	14:52	12	1	D2	MBT002	139	56° 21.05'	169° 27.50'	Meth	BioOther,QTowF	night; jelly weight/bell diameter;
6-Sep	16:12	13	1	D4	MBT003	98	56° 27.32'	169° 28.24'	LG-CB	QTowF	scanmar used to determine depth twilight; jelly weight/bell diameter; Somerton jellyfish; Wainright isotopes; scanmar used to determine depth
6-Sep	16:12	13	1	D4	MBT003	98	56° 27.32'	169° 28.24'	Meth	BioOther,QTowF	twilight; jelly weight/bell diameter; Somerton jellyfish; Wainright isotopes; scanmar used to determine depth
6-Sep	17:07	14	1	D6	MBT004	71	56° 32.24'	169° 28.94'	LG-CB	QTowF	day; jelly weight/bell diameter; scanmar used to determine depth
6-Sep	17:07	14	1	D6	MBT004	71	56° 32.24'	169° 28.94'	Meth	BioOther,QTowF	day; jelly weight/bell diameter;
6-Sep	18:22	15	1	D6	MBT005	74	56° 31.68'	169° 29.56'	Ancho	Discard	scanmar used to determine depth day; codend opened during cast; haul will be redone
6-Sep	19:32	15	2	D6	MBT006	70	56° 32.40'	169° 28.85'	Ancho	J-Gut,J-Length,J-Oto	day; codend failed; but fish picked from webbing
6-Sep	21:36	16	1	D4	MBT007	100	56° 27.36'	169° 28.24'	Ancho	BioOther,J-Gut,J-Length,J-Oto	day; jellyfish weight; Somerton jellyfish; isotopes; Morado parasites
6-Sep	23:00	17	1		MBT008	83	56° 30.28'	169° 27.61'	Eastern	A-Gut,A-Length,J-Gut	day

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FOCI CRUISE 10MF96

Date (GMT)	Time (GMT)	Station	Haul	FOCI Grid No.	Alternate Station No.	Depth (m)	Latitude N	Longitude W	Gear	Samples Collected	Haul Comments
7-Sep	0:33	18	1	D5	CTD009	83	56° 29.81'	169° 28.44'	CTD	BioOther, CHLAM, CTD, Fluor, PAR	day; TAPS6
7-Sep	1:11	19	1	D4	CTD010	89	56° 27.29'	169° 28.34'	CTD	BioOther, CHLAM, CTD, Fluor, PAR	day; TAPS6
7-Sep	1:55	20	1	D3	CTD011	123	56° 23.94'	169° 27.96'	CTD	BioOther, CHLAM, CTD, Fluor, PAR	day; TAPS6
7-Sep	3:00	21	1	D2	CTD012	136	56° 21.13'	169° 28.27'	CTD	BioOther, CHLAM, CTD, Fluor, PAR	day; TAPS6
7-Sep	3:54	22	1	D1	CTD013	234	56° 17.01'	169° 26.81'	CTD	BioOther, CHLAM, CTD, Fluor, PAR	day; TAPS6
7-Sep	6:00	23	1	D2	MOC001	135	56° 21.41'	169° 27.11'	MOC1	Discard	night; electronics problem; aborted tow
7-Sep	7:15	23	2	D2	MBT009	136	56° 21.33'	169° 27.52'	LG-CB	Q Towf	night; jelly weight/bell diameter; tow time not recorded but was estimated from haul rates; scanmar used to determine depth
7-Sep	7:15	23	2	D2	MBT009	136	56° 21.33'	169° 27.52'	Meth	BioOther, Q Towf	night; jelly weight/bell diameter; tow time not recorded but was estimated from haul rates; scanmar used to determine depth
7-Sep	8:56	23	3	D2	MOC002	135	56° 20.86'	169° 28.05'	MOC1	BioOther, Q Towf	night; TAPS6
7-Sep	10:56	24	1	D4	MOC003	109	56° 27.48'	169° 28.24'	MOC1	Q Towf	night; TAPS6
7-Sep	12:22	24	2	D4	MBT010	99	56° 27.86'	169° 27.46'	LG-CB	Q Towf	night; jelly weight/bell diameter; scanmar used to determine depth
7-Sep	12:22	24	2	D4	MBT010	99	56° 27.86'	169° 27.46'	Meth	BioOther, Q Towf	night; jelly weight/bell diameter; scanmar used to determine depth
7-Sep	13:18	25	1	D6	MBT011	75	56° 32.03'	169° 29.24'	LG-CB	Q Towf	night; TAPS6
7-Sep	13:18	25	1	D6	MBT011	75	56° 32.03'	169° 29.24'	Meth	BioOther, Q Towf	night; TAPS6
7-Sep	14:27	25	2	D6	MOC004	74	56° 32.12'	169° 28.90'	MOC1	BioOther, Q Towf	night; TAPS6
7-Sep	18:39	26	1	C1	CTD014	53	57° 06.46'	169° 44.36'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
7-Sep	19:16	27	1	C2	CTD015	59	57° 03.66'	169° 43.12'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
7-Sep	19:37	27	2	C2	CTD15B	59	57° 03.57'	169° 43.28'	CTD	BioOther, CHLAM, CTD, Fluor, PAR	day; TAPS6 (repeated for TAPS6)
7-Sep	20:12	28	1	C3	CTD016	60	57° 00.76'	169° 41.98'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
7-Sep	20:54	29	1	C4	CTD017	62	56° 57.37'	169° 40.98'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
7-Sep	21:33	30	1	C5	CTD018	67	56° 54.74'	169° 40.11'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
7-Sep	22:32	31	1	C6	CTD019	70	56° 48.37'	169° 37.21'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6. MBT012 also done here as calibration.
7-Sep	23:22	32	1	C7	CTD020	80	56° 42.90'	169° 35.93'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
8-Sep	0:09	33	1	C8	CTD021	70	56° 38.14'	169° 35.87'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6. MBT013 also done here as calibration.
8-Sep	0:38	34	1	C9	CTD022	46	56° 37.07'	169° 34.74'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
8-Sep	0:48	35	1			43	56° 37.00'	169° 34.32'	Trans	EK500, SSF, TSG	day; line C start
8-Sep	4:30	35	2			54	57° 06.86'	169° 42.59'	Trans	EK500, SSF, TSG	day/dusk?; line C end

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Date (GMT)	Time (GMT)	Station	Haul	FOCI Grid No.	Alternate Station No.	Depth (m)	Latitude N	Longitude W	Gear	Samples Collected	Haul Comments
8-Sep	5:40	36	1	C3	MBT014	62	57° 00.70'	169° 42.23'	Ancho	BioOther,J-Gut,J-Length,J-Oto	night; jelly weight/bell diameter; Sormerton prowlfish; Wainright isotopes; Morado parasites; Busby cod
8-Sep	7:27	37	1	C6	MBT015	70	56° 48.16'	169° 38.11'	Ancho	BioOther,J-Gut,J-Length,J-Oto	night; jelly weight/bell diameter; Morado parasites; Busby cod
8-Sep	8:24	37	2	C6	MBT016	69	56° 48.39'	169° 37.44'	Eastern	A-Gut,A-Length	night; Busby lumpsucker
8-Sep	10:15	38	1	C8	MBT018	72	56° 38.36'	169° 36.68'	Ancho	BioOther,J-Gut,J-Length,J-Oto	night; jelly weight/bell diameter; no MBT017 due to #ing mix up
8-Sep	11:00	39	1			44	56° 36.99'	169° 34.82'	Trans	EK500,SSF,TSG	night; line C start
8-Sep	14:04	39	2			54	57° 06.98'	169° 42.64'	Trans	EK500,SSF,TSG	night; line C end
8-Sep	14:59	40	1	C3		61	57° 00.98'	169° 41.62'	LG-CB	Q Towf	night; jelly weight/bell diameter; Wainright isotopes; no MBT file this cast; scanmar used to determine depth
8-Sep	14:59	40	1	C3		61	57° 00.98'	169° 41.62'	Meth	BioOther,Q Towf	night; jelly weight/bell diameter; Wainright isotopes; no MBT file this cast; scanmar used to determine depth
8-Sep	16:29	41	1	C6	MBT019	70	56° 48.19'	169° 37.75'	LG-CB	Q Towf	twilight; jelly weight/bell diameter; Wainright isotopes; scanmar used to determine depth
8-Sep	16:29	41	1	C6	MBT019	70	56° 48.19'	169° 37.75'	Meth	BioOther,Q Towf	twilight; jelly weight/bell diameter; Wainright isotopes; scanmar used to determine depth
8-Sep	17:39	42	1	C8	MBT020	71	56° 38.28'	169° 36.00'	LG-CB	Q Towf	Wainright isotopes; scanmar used to determine depth
8-Sep	17:39	42	1	C8	MBT020	71	56° 38.28'	169° 36.00'	Meth	Q Towf	Wainright isotopes; scanmar used to determine depth
8-Sep	18:33	42	2	C8	MBT021	68	56° 37.96'	169° 36.43'	Ancho	BioOther,J-Gut,J-Length,J-Oto	day; jelly weight/bell diameter; Morado parasites
8-Sep	20:17	43	1	C6	MBT023	69	56° 48.16'	169° 37.83'	Ancho	BioOther,J-Gut,J-Length,J-Oto	day; jelly weight/bell diameter; Morado parasites
8-Sep	22:10	44	1	C3	MBT024	61	57° 00.80'	169° 42.01'	Ancho	BioOther,J-Gut,J-Length,J-Oto	day; jelly weight/bell diameter; Morado parasites; Busby cod & ATF
8-Sep	23:08	45	1			54	57° 06.88'	169° 42.64'	Trans	EK500,SSF,TSG	day; line C start

4-16 SEP 1996

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Date (GMT)	Time (GMT)	Station	Haul	FOCI Grid No.	Alternate Station No.	Depth (m)	Latitude N	Longitude W	Gear	Samples Collected	Haul Comments
9-Sep	2:30	45	2	C8	MBT025	31	56° 36.92'	169° 34.96'	Trans	EK500,SSF,TSG	day, line C end
9-Sep	2:57	46	1	C8	MBT025	67	56° 38.05'	169° 36.04'	Eastern	A-Gut,A-Length,BioOther	day, Somerton prowlfish; Busby liparis sp.
9-Sep	5:35	46	2	C8	MBT026	66	56° 37.98'	169° 36.15'	Ancho	J-Gut,J-Length,J-Oto	dusk; jelly weight; Morado parasites
9-Sep	6:53	46	3	C8	MBT027	67	56° 38.00'	169° 36.29'	LG-CB	QTowF	night; jelly weight; scanmar used to determine depth
9-Sep	6:53	46	3	C8	MBT027	67	56° 38.00'	169° 36.29'	Meth	QTowF	night; jelly weight; scanmar used to determine depth
9-Sep	8:06	46	4	C8	MOC005	67	56° 38.26'	169° 36.00'	MOC1	BioOther,QTowF	night; TAPS6
9-Sep	9:39	47	1	C8	MOC006	70	56° 48.37'	169° 37.48'	MOC1	BioOther,QTowF	night; TAPS6
9-Sep	10:23	47	2	C6	MBT028	70	56° 48.07'	169° 37.70'	LG-CB	QTowF	night; jelly weight/bell diameter; scanmar used to determine depth
9-Sep	10:23	47	2	C6	MBT028	70	56° 48.07'	169° 37.70'	Meth	BioOther,QTowF	night; jelly weight/bell diameter; scanmar used to determine depth
9-Sep	11:47	48	1	C3	MBT029	63	57° 00.51'	169° 41.94'	LG-CB	QTowF	night; jelly weight/bell diameter; scanmar used to determine depth
9-Sep	11:47	48	1	C3	MBT029	63	57° 00.51'	169° 41.94'	Meth	BioOther,QTowF	night; jelly weight/bell diameter; scanmar used to determine depth
9-Sep	12:26	48	2	C3	MOC007	62	57° 00.66'	169° 42.12'	MOC1	BioOther,QTowF	night; TAPS6
9-Sep	13:22	49	1	C3	MOC007	54	57° 06.90'	169° 42.56'	Trans	EK500,SSF,TSG	night; line C start
9-Sep	16:45	49	2	C3	MOC007	46	56° 37.15'	169° 34.81'	Trans	EK500,SSF,TSG	night; line C end
9-Sep	19:58	50	1	B1	CTD023	111	56° 41.59'	170° 36.99'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6
9-Sep	21:06	51	1	B2	CTD024	104	56° 47.38'	170° 31.25'	CTDB	CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6 failed
9-Sep	22:06	52	1	B3	CTD025	97	56° 53.12'	170° 26.59'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6
9-Sep	22:40	53	1	B4	CTD026	92	56° 54.85'	170° 23.81'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6
9-Sep	23:21	54	1	B5	CTD027B	83	56° 56.88'	170° 21.53'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6; CTD spiky on first cast came to surface & sent down again
10-Sep	0:02	55	1	B6	CTD028	65	57° 00.14'	170° 18.71'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6
10-Sep	0:41	56	1	B7	CTD029	51	57° 02.84'	170° 16.82'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6
10-Sep	1:19	57	1	B8	CTD030	34	57° 05.72'	170° 13.13'	CTDB	BioOther,CHLAM,Chlor,CTD,Fluor,Nut,PAR	day; TAPS6
10-Sep	1:36	58	1	B8	CTD030	34	57° 05.47'	170° 13.74'	Trans	EK500,SSF,TSG	day; line B start
10-Sep	4:37	58	2	B3	MBT030	111	56° 41.76'	170° 36.96'	Trans	EK500,SSF,TSG	day; line B end
10-Sep	6:11	59	1	B3	MBT030	97	56° 53.08'	170° 26.42'	Eastern	A-Gut,A-Length,J-Length	twilight
10-Sep	7:15	59	2	B3	MBT030	97	56° 52.88'	170° 26.73'	20Bon	BioOther	nonquantitative; Wainright isotopes; Henrichs
10-Sep	7:15	59	2	B3	MBT030	97	56° 52.88'	170° 26.73'	60Bon	BioOther	nonquantitative; Wainright isotopes; Henrichs
10-Sep	8:05	60	1	B3	MBT031	98	56° 52.95'	170° 26.60'	LG-CB	QTowF	night; jelly weight/bell diameter; scanmar used to determine depth

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10-Sep	8:05	60	1	B3	MBT031	98	56° 52.95'	170° 26.60'	Meth	BioOther, Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth
10-Sep	9:08	61	1	B6	MBT032	65	56° 59.90'	170° 18.91'	LG-CB	Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth
10-Sep	9:08	61	1	B6	MBT032	65	56° 59.90'	170° 18.91'	Meth	BioOther, Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth
10-Sep	9:59	62	1	B8	MBT033	34	57° 05.57'	170° 13.50'	LG-CB	Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth
10-Sep	9:59	62	1	B8	MBT033	34	57° 05.57'	170° 13.50'	Meth	BioOther, Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth
10-Sep	10:17	63	1			34	57° 05.76'	170° 13.09'	Trans	EK500, SSF, TSG	night; line B start
10-Sep	13:31	63	2			112	56° 41.71'	170° 36.95'	Trans	EK500, SSF, TSG	night; line B end
10-Sep	15:08	64	1	B3	MBT034	98	56° 52.94'	170° 26.67'	Ancho	BioOther, J-Gut, J-Length, J-Oto	night; jelly weight/bell diameter
10-Sep	16:33	65	1	B6	MBT035	66	56° 59.82'	170° 19.24'	Ancho	BioOther, J-Gut, J-Length, J-Oto	twilight; jelly weight/bell diameter
10-Sep	17:41	66	1	B8	MBT036	34	57° 05.51'	170° 14.00'	Ancho	BioOther, J-Gut, J-Length, J-Oto	day; jelly weight/bell diameter
10-Sep	19:05	67	1	B6	MBT037	65	56° 59.98'	170° 18.71'	Eastern	A-Gut, A-Length, J-Gut	day
10-Sep	19:55	67	2	B6		65	56° 59.93'	170° 19.14'	60Bon	Discard	tow for Henrichs discarded due to heavy phyto
10-Sep	20:51	68	1			84	57° 05.03'	170° 13.85'	Trans	EK500, SSF, TSG	day; line B start
10-Sep	23:54	68	2			111	56° 41.70'	170° 37.07'	Trans	EK500, SSF, TSG	day; line B end
11-Sep	1:25	69	1	B3	MBT038	99	56° 52.94'	170° 27.02'	Ancho	BioOther, J-Gut, J-Length, J-Oto	day; jelly weight/bell diameter; Wainright istopes; Morado parasites
11-Sep	2:37	70	1	B6	MBT039	66	56° 59.65'	170° 19.66'	Ancho	BioOther, J-Gut, J-Length, J-Oto	day; jelly weight/bell diameter; Morado parasites; Loggenwell bird studies
11-Sep	3:44	71	1	B8	MBT040	33	57° 05.33'	170° 13.96'	Ancho	BioOther, J-Gut, J-Length, L-Oto	twilight; jelly weight/bell diameter; Morado parasites; Busby cod & sandfish; net ripped-urchins and cukes in net
11-Sep	5:17	71	2	B8	MBT041	34	57° 05.76'	170° 13.40'	LG-CB	Q TowF	twilight; jelly weight/bell diameter; scanmar used to determine depth
11-Sep	5:17	71	2	B8	MBT041	34	57° 05.76'	170° 13.40'	Meth	BioOther, Q TowF	twilight; jelly weight/bell diameter; scanmar used to determine depth
11-Sep	6:10	71	3	B8	MOC008	34	57° 05.76'	170° 13.11'	MOC1	BioOther, Q TowF	twilight; TAPS6; Henrichs
11-Sep	7:30	72	1	B6	MOC009	65	56° 59.91'	170° 18.86'	MOC1	BioOther, Q TowF	night; TAPS6; Henrichs
11-Sep	8:23	72	2	B6	MBT042	65	56° 59.93'	170° 18.94'	LG-CB	Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth
11-Sep	8:23	72	2	B6	MBT042	65	56° 59.93'	170° 18.94'	Meth	Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth

Table 1 MF96-13 CRUISE SUMMARY
FOCI CRUISE 10MF96

Date (GMT)	Time (GMT)	Station	Haul	FOCI Grid No.	Alternate Station No.	Depth (m)	Latitude N	Longitude W	Gear	Samples Collected	Haul Comments
11-Sep	9:32	73	1	B3	MBT043	98	56° 52.89'	170° 27.04'	LG-CB	Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth
11-Sep	9:32	73	1	B3	MBT043	98	56° 52.89'	170° 27.04'	Meth	BioOther, Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth
11-Sep	10:20	73	2	B3	MOC010	98	56° 52.99'	170° 26.91'	MOC1	BioOther, Q TowF	night; TAPS6
11-Sep	12:08	74	1	B1		95	56° 41.51'	170° 37.65'	20Bon	BioOther	nonquantitative; Henrichs
11-Sep	12:08	74	1	B1		95	56° 41.51'	170° 37.65'	60Bon	BioOther	nonquantitative; Henrichs
11-Sep	12:28	75	1			112	56° 41.59'	170° 37.03'	Trans	EK500, SSF, TSG	night; line B start
11-Sep	15:28	75	2			34	57° 05.68'	170° 13.30'	Trans	EK500, SSF, TSG	night; line B end
11-Sep	17:21	76	1			25	57° 14.92'	170° 12.85'	Trans	EK500, SSF, TSG	day; line A start
11-Sep	20:19	76	2			71	57° 35.29'	169° 55.75'	Trans	EK500, SSF, TSG	day; line A end
11-Sep	20:42	77	1	A1	CTD031	70	57° 34.23'	169° 56.49'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
11-Sep	21:42	78	1	A2	CTD032	65	57° 29.46'	170° 00.92'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
11-Sep	22:26	79	1	A3	CTD033	63	57° 25.99'	170° 03.25'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
11-Sep	23:07	80	1	A4	CTD034	61	57° 23.52'	170° 06.22'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
11-Sep	23:45	81	1	A5	CTD035	56	57° 20.92'	170° 08.10'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
12-Sep	0:13	82	1	A6	CTD036	52	57° 19.46'	170° 08.60'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
12-Sep	0:41	83	1	A7	CTD037	50	57° 18.52'	170° 09.42'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
12-Sep	1:10	84	1	A8	CTD038	37	57° 17.26'	170° 10.10'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
12-Sep	1:39	85	1	A9	CTD039	28	57° 15.98'	170° 11.12'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
12-Sep	2:09	86	1	A10	CTD040	24	57° 14.68'	170° 12.84'	CTDB	BioOther, CHLAM, Chlor, CTD, Fluor, Nut, PAR	day; TAPS6
12-Sep	2:59	87	1	A8	MBT044	38	57° 17.23'	170° 10.23'	LG-CB	Q TowF	day; jelly weight/bell diameter; scanmar used to determine depth
12-Sep	2:59	87	1	A8	MBT044	38	57° 17.23'	170° 10.23'	Meth	BioOther, Q TowF	day; jelly weight/bell diameter; scanmar used to determine depth
12-Sep	4:12	87	2	A8	MBT045	37	57° 16.85'	170° 10.22'	Eastern	A-Gut, A-Length	day; TAPS6
12-Sep	6:15	87	3	A8	MOC011	37	57° 17.17'	170° 10.18'	MOC1	BioOther, Q TowF	night; TAPS6
12-Sep	7:24	88	1	A6	MOC012	52	57° 19.23'	170° 08.74'	MOC1	BioOther, Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth
12-Sep	8:19	88	2	A8	MBT046	52	57° 19.39'	170° 08.80'	LG-CB	Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth
12-Sep	8:19	88	2	A6	MBT046	52	57° 19.39'	170° 08.80'	Meth	BioOther, Q TowF	night; jelly weight/bell diameter; scanmar used to determine depth
12-Sep	9:06	89	1	A4		60	57° 23.30'	170° 06.07'	Meth	Discard	cable snapped; Methot, MBT, scanmar, LG-CB and flowmeters lost
12-Sep	17:04	90	1	A4		60	57° 23.33'	170° 05.76'	Ancho	BioOther, J-Gut, J-Length, J-Oto	day; jelly weight/bell diameter; Somerton prowlfish
12-Sep	18:16	91	1	A6		52	57° 19.15'	170° 08.49'	Ancho	BioOther, J-Gut, J-Length, J-Oto	day; jelly weight/bell diameter
12-Sep	19:16	92	1	A8	MBT047	37	57° 17.07'	170° 10.21'	Ancho	BioOther, J-Gut, J-Length, J-Oto	day; jelly weight/bell diameter; Somerton prowlfish; Morado parasites
12-Sep	20:02	93	1			25	57° 14.61'	170° 13.04'	Trans	EK500, SSF, TSG	day; line A start

4-16 SEP 1996

Table 1 MF96-13 CRUISE SUMMARY
FOCI CRUISE 10MF96

Date (GMT)	Time (GMT)	Station	Haul	FOCI Grid No.	Alternate Station No.	Depth (m)	Latitude N	Longitude W	Gear	Samples Collected	Haul Comments
12-Sep	22:43	93	2			71	57° 35.31'	169° 55.74'	Trans	EK500,SSF,TSG	day; line A end
13-Sep	0:27	94	1	A4	MBT048	60	57° 22.87'	170° 06.33'	Eastern	A-Gut,A-Length	day; Busby prowfish
13-Sep	1:44	94	2	A4	MBT049	59	57° 23.35'	170° 06.25'	Ancho	BioOther,J-Gut,J-Length,J-Oto	day; jelly weight/bell diameter; Morado parasites
13-Sep	3:20	95	1	A6	MBT050	52	57° 19.34'	170° 08.57'	Ancho	BioOther,J-Gut,J-Length,J-Oto	day; jelly weight/bell diameter; Wainright istopes; Morado parasites
13-Sep	4:34	96	1	A8	MBT051	41	57° 17.04'	170° 09.46'	Ancho	BioOther,J-Gut,J-Length,J-Oto	day/wlight; jelly weight/bell diameter; Somerton prowfish; Morado parasites; Busby fish(?)
13-Sep	6:14	96	2	A8	MBT052	36	57° 16.95'	170° 10.39'	Meth	Discard	night; hit bottom
13-Sep	6:57	97	1	A6	MBT053	52	57° 19.32'	170° 08.91'	LG-CB	QTowF	night; scanmar used to determine depth
13-Sep	6:57	97	1	A6	MBT053	52	57° 19.32'	170° 08.91'	Meth	QTowF	night; scanmar used to determine depth
13-Sep	7:41	98	1	A8	MBT054	36	57° 17.11'	170° 10.35'	LG-CB	QTowF	night; jelly weight/bell diameter; scanmar read 3m when well below surface. Used w/o forthis tow.
13-Sep	7:41	98	1	A4	MBT054	36	57° 17.11'	170° 10.35'	Meth	BioOther,QTowF	scanmar read 9m at max; MBT said 17.6 m
13-Sep	8:38	99	1	A4	MBT055	61	57° 23.34'	170° 05.89'	LG-CB	QTowF	night; jelly weight/bell diameter; scanmar used to determine fishing depth but max depth came from MBT after comparison
13-Sep	8:38	99	1	A4	MBT055	61	57° 23.34'	170° 05.89'	Meth	BioOther,QTowF	night; jelly weight/bell diameter; scanmar used to determine fishing depth but max depth came from MBT after comparison
13-Sep	9:29	99	2	A4	MOC013	60	57° 23.70'	170° 06.01'	MOC1	BioOther,QTowF	night; TAPS6
13-Sep	10:46	100	1			24	57° 14.64'	170° 13.03'	Trans	EK500,SSF,TSG	night; line A start
13-Sep	13:17	100	2			70	57° 34.48'	169° 56.40'	Trans	EK500,SSF,TSG	night; line a end
13-Sep	13:32	101	1	A1		71	57° 34.48'	169° 57.09'	20Bon	BioOther	nonquantitative Henrichs
13-Sep	13:32	101	1	A1		71	57° 34.48'	169° 57.09'	60Bon	BioOther	nonquantitative Henrichs
13-Sep	14:06	101	2	A1	MOC014	72	57° 34.58'	169° 56.34'	MOC1	BioOther,QTowF	night; TAPS6
13-Sep	16:21	102	1	A6	MOC015	53	57° 19.41'	170° 08.39'	MOC1	BioOther,QTowF	night; TAPS6

Table 1 MF96-13 CRUISE SUMMARY
FOCI CRUISE 10MF96

Date (GMT)	Time (GMT)	Station	Haul	Grid No.	FOCI	Alternate Station No.	Depth (m)	Latitude N	Longitude W	Gear	Samples Collected	Haul Comments
13-Sep	17:19	102	2	A6	A6	MBT056	52	57° 19.35'	170° 08.45'	LG-CB	QToWF	4-16 SEP 1996 Haul Comments day; jely weight/bell diameter; Wainright isotopes; scanmar used to determine depth day; jely weight/bell diameter; Wainright isotopes; scanmar used to determine depth
13-Sep	17:19	102	2	A6	A6	MBT056	52	57° 19.35'	170° 08.45'	Meth	BioOther, QToWF	day day; TAPS6 & TAPS4 held at 5m for 10 min then downcast at 15 m/min. pattern repeated. TAPS4 failed day; jely weight/bell diameter; Morado parasites
13-Sep	18:07	102	3	A6	A6	MBT057	54	57° 19.12'	170° 08.20'	Eastern	A-Gut, A-Length, BioOther	day; jely weight/bell diameter
13-Sep	20:51	102	4	A6	A6	CTD041	52	57° 19.44'	170° 08.51'	CTD	BioOther, CHLAM, CTD, Fluor, PAR	day; jely weight/bell diameter
13-Sep	23:00	102	5	A6	A6	MBT058	52	57° 19.38'	170° 08.46'	Ancho	BioOther, J-Gut, J-Length, J-Oto	day; jely weight/bell diameter; Morado parasites
13-Sep	23:53	102	6	A6	A6	MBT059	52	57° 19.27'	170° 08.55'	Eastern	A-Gut, A-Length, BioOther	day
14-Sep	1:10	102	7	A6	A6	MBT060	53	57° 19.29'	170° 08.48'	LG-CB	QToWF	day; jely weight/bell diameter
14-Sep	1:10	102	7	A6	A6	MBT060	53	57° 19.29'	170° 08.48'	Meth	BioOther, QToWF	day; jely weight/bell diameter
14-Sep	2:05	102	8	A6	A6	MOC016	50	57° 19.18'	170° 08.95'	MOC1	BioOther, QToWF	day; TAPS6
14-Sep	3:59	102	9	A6	A6	MOC016	52	57° 19.63'	170° 08.33'	Eastern	A-Gut, A-Length, BioOther	day
14-Sep	6:46	102	10	A6	A6	MBT062	54	57° 19.17'	170° 08.11'	Ancho	BioOther, J-Gut, J-Length, J-Oto	night; jely weight/bell diameter; Morado parasites; Kendall rockfish; Loggerwell capelin
14-Sep	9:39	102	11	A6	A6	MOC017	51	57° 19.47'	170° 08.58'	MOC1	BioOther, QToWF	night; TAPS6
14-Sep	11:02	102	12	A6	A6	MBT063	52	57° 19.45'	170° 08.35'	LG-CB	QToWF	night; jely weight/bell diameter; scanmar used to determine depth
14-Sep	11:02	102	12	A6	A6	MBT063	52	57° 19.45'	170° 08.35'	Meth	BioOther, QToWF	night; Somerton prowlfish
14-Sep	12:25	102	13	A6	A6	MBT064	52	57° 19.63'	170° 09.48'	Eastern	A-Gut, A-Length	night; jely weight/bell diameter
14-Sep	14:29	102	14	A6	A6	MBT065	53	57° 19.41'	170° 07.78'	Ancho	BioOther, J-Gut, J-Length, J-Oto	night; jely weight/bell diameter
14-Sep	15:47	102	15	A6	A6	MBT066	52	57° 19.45'	170° 08.25'	Eastern	A-Gut	night; jely weight/bell diameter
14-Sep	18:10	102	16	A6	A6	MOC018	52	57° 19.50'	170° 08.55'	MOC1	BioOther, QToWF	night
14-Sep	20:54	102	17	A6	A6	MBT067	51	57° 19.48'	170° 08.51'	LG-CB	QToWF	day; TAPS6
14-Sep	20:54	102	17	A6	A6	MBT067	51	57° 19.48'	170° 08.51'	Meth	BioOther, QToWF	day; jely weight/bell diameter
14-Sep	21:46	102	18	A6	A6	MOC019	52	57° 19.40'	170° 08.79'	MOC1	BioOther, QToWF	day; jely weight/bell diameter
14-Sep	22:42	102	19	A6	A6	MBT068	52	57° 19.42'	170° 08.04'	Eastern	A-Gut, A-Length	day; Collins age-0 pollock
15-Sep	1:19	102	20	A6	A6	MBT069	52	57° 19.44'	170° 08.31'	Ancho	BioOther, J-Gut, J-Length, J-Oto	day; jely weight/bell diameter; Somerton jely & prowlfish; Morado parasites; Brodeur sandfish
15-Sep	2:44	102	21	A6	A6	MOC020	53	57° 19.54'	170° 07.47'	MOC1	BioOther, QToWF	day; TAPS6
15-Sep	3:35	102	22	A6	A6	MBT070	53	57° 19.49'	170° 08.20'	LG-CB	QToWF	day; jely weight/bell diameter
15-Sep	3:35	102	22	A6	A6	MBT070	53	57° 19.49'	170° 08.20'	Meth	BioOther, QToWF	day; jely weight/bell diameter
15-Sep	4:44	102	23	A6	A6	MBT071	53	57° 19.45'	170° 07.81'	Eastern	A-Gut, A-Length, BioOther	twilight; Busby darkfin sculpin

Table 1 MF96-13 CRUISE SUMMARY
FOCI CRUISE 10MF96

Date (GMT)	Time (GMT)	Station	Haul	FOCI Grid No.	Alternate Station No.	Depth (m)	Latitude N	Longitude W	Gear	Samples Collected	Haul Comments
15-Sep	6:51	102	24	A6	MOC021	53	57° 19.41'	170° 07.65'	MOC1	BioOther, Q TowF	night; TAPS6
15-Sep	8:50	102	25	A6	MBT072	52	57° 19.36'	170° 08.86'	Ancho	BioOther, J-Gut, J-Length, J-Oto	night; jelly weight/bell diameter
15-Sep	9:39	102	26	A6	MBT073	52	57° 19.46'	170° 08.46'	Eastern	A-Gut, BioOther, J-Length	night; Somerton prowlfish
15-Sep	11:06	102	27	A6	MOC022	50	57° 19.48'	170° 08.48'	MOC1	BioOther, Q TowF	night; TAPS6
15-Sep	12:07	103	1			25	57° 14.68'	170° 12.97'	Trans	EK500, SSF, TSG	night; line A start
15-Sep	14:34	103	2			72	57° 34.50'	169° 56.45'	Trans	EK500, SSF, TSG	night; line A end
15-Sep	16:26	104	1	A6	MBT074	52	57° 19.59'	170° 08.38'	Ancho	BioOther, J-Gut, J-Length, J-Oto	night; part of diel at st. 102; jelly weight/bell diameter; Somerton prowlfish
15-Sep	17:52	105	1	A4	MBT075	60	57° 23.54'	170° 05.88'	Eastern	A-Gut, A-Length	day
15-Sep	22:38	106	1			54	57° 06.89'	169° 42.66'	Trans	EK500, SSF, TSG	day; line C start
16-Sep	2:13	106	2			43	56° 36.98'	169° 34.64'	Trans	EK500, SSF, TSG	day; line C end
16-Sep	6:32	107	1			103	56° 52.81'	170° 38.05'	60Bon	BioOther	nonquantitative; Henrichs
16-Sep	6:52	107	2			102	56° 53.28'	170° 38.36'	60Bon	BioOther	nonquantitative; Henrichs
16-Sep	7:13	107	3			101	56° 53.89'	170° 38.90'	60Bon	BioOther	nonquantitative; Henrichs

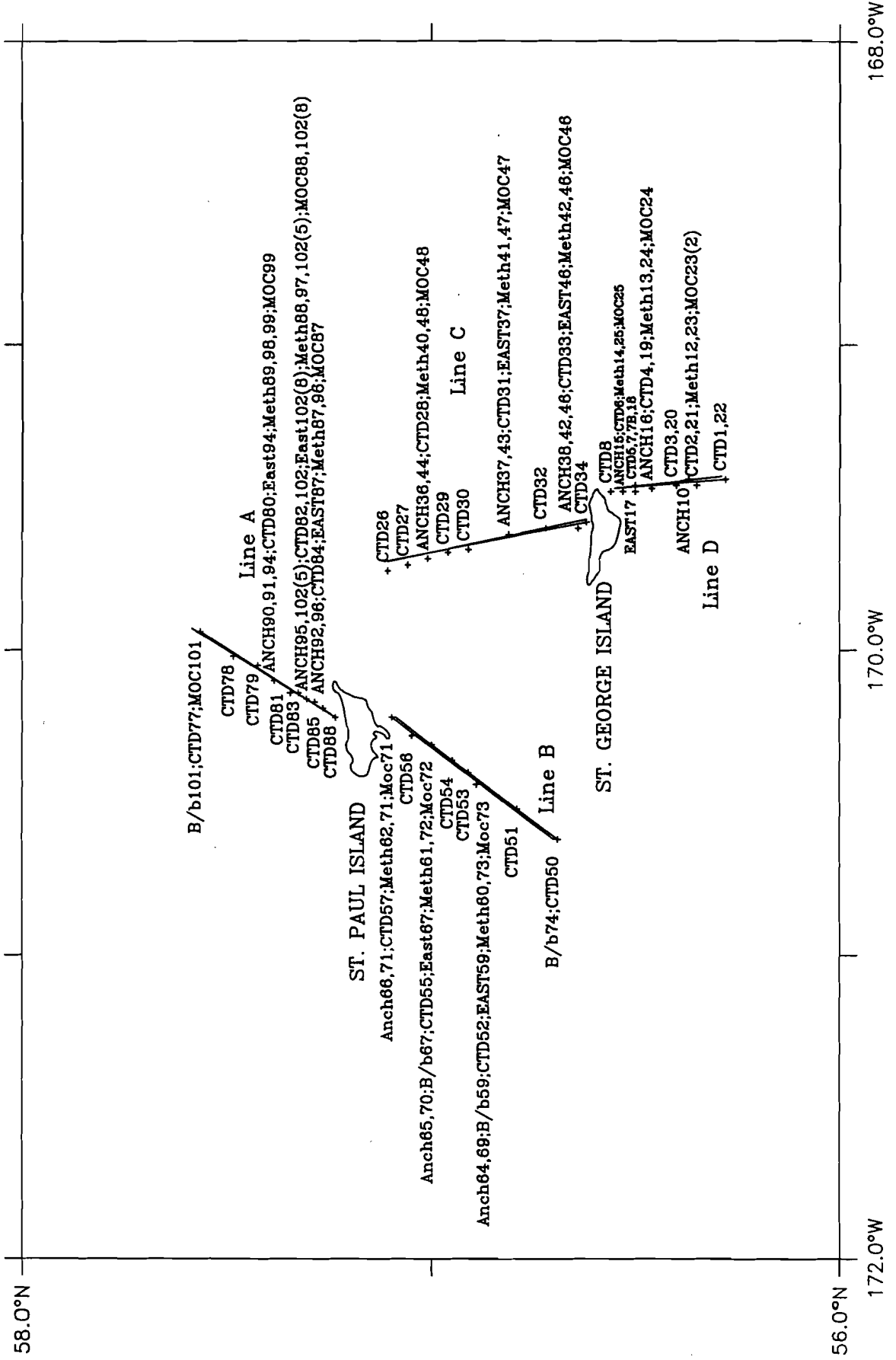


Figure 1. Station locations for FOCI cruise 10MF96 in the Bering Sea. Shown are the locations of the acoustic transects, CTD deployments, anchovy trawls, Methot trawls, MOCNESS tows, and bottom trawls.