

E. P. Colwell

CRUISE REPORT

Cruise Number: MF9506
FOCI Number: 6MF95
NOAA Ship: Miller Freeman
Area of Operations: Eastern Bering Sea
Itinerary: Departed Dutch Harbor 16 April
Arrived Dutch Harbor 1 May

Participating Organizations: Alaska Fisheries Science Center (AFSC/NOAA),
Pacific Marine Environmental Lab. (PMEL/NOAA)
University of Alaska

Chief Scientist : Sigrid Salo, PMEL/NOAA

Personnel:

Lisa Britt, AFSC
Audra Janiak, University of Alaska
Leslie Lawrence, PMEL
Lynn Long, PMEL
Nazila Merati, AFSC
Bill Rugen, AFSC
Sigrid Salo, PMEL

Objectives of Cruise:

The objectives of cruise MF9506 were:

To perform a bongo survey of the southeast Bering Sea slope and shelf, along with feeding/predator experiments in larval patches in each of the two regions. The regions are delineated in the figures at the end of this report.

To examine currents and transport of organisms through Unimak Pass with a CTD and bongo survey.

To calibrate moorings 95BSM1-3 with MOCNESS and bongo tows and CTD's, and to examine spatial scales of flow between moorings 95BSM2 and 95BSM3 with a CTD section between them.

Summary of Operations:

On this cruise, we occupied 150 stations. Most were bongo stations, but we also did 52 CTD casts and 5 MOCNESS tows.

A Cruise Sampling Summary is appended to this report as Table 1.

Operations:

The cruise track is shown in Figure 1, and operations at all stations are listed in Table 2. Stations started with a 60cm bongo tow, including a rough count from net 2. FOCI investigators requested other operations at specific sites, or when larval concentrations were high. These included CTD's, 20cm bongos, Tucker trawls, MOCNESS tows, live tows, and CalVet tows, and a special set of nets for the 60cm bongos to determine if yolk-sac larvae were passing through the 333 mesh nets. Unfortunately, we found very few larvae, so this experiment was halted roughly halfway through the cruise. We also collected larvae for genetic studies.

We started work at the outer slope stations and worked toward the east. Larval concentrations were very low except at a few sites on line BS (figure 2), so to save time, we interrupted line BJ to return to BS for the larval patch study before completing the slope survey.

After completing the slope grid, we occupied the Unimak Pass stations, starting at the western station in the pass itself and working anticlockwise. This is the only part of the cruise which included an intensive CTD survey to examine currents and transport.

Next, we went to the two stations inside the Unimak box, deploying ARGOS buoy 7211 between them, and continued on to mooring 95BSM1 on the shelf.

Our course on the shelf became rather tortuous, which will cause us problems with data analysis. We started at the two southern rows of stations, because the northern stations were still covered by ice. We lost a day to a storm as we headed back west on rows 7-10. By the time we had reached the northern stations, the ice had receded, so we completed the northern end of the shelf grid.

Both of the moorings in this area had been dragged by the ice, and neither was transmitting data or positions. We therefore modified our course to arrive at their sites in daylight hours. We were unable to identify a certain position for mooring 95BSM3, the northwestern mooring, but did locate and recover mooring 95BSM2, which had lost its tower, meteorological instruments, and much of its surface float to the ice.

Some very preliminary results:

Rough counts of larval concentration (Figure 2) were low almost everywhere on the slope and shelf. Egg concentrations (figure 3) were higher; there was a large patch on the middle shelf.

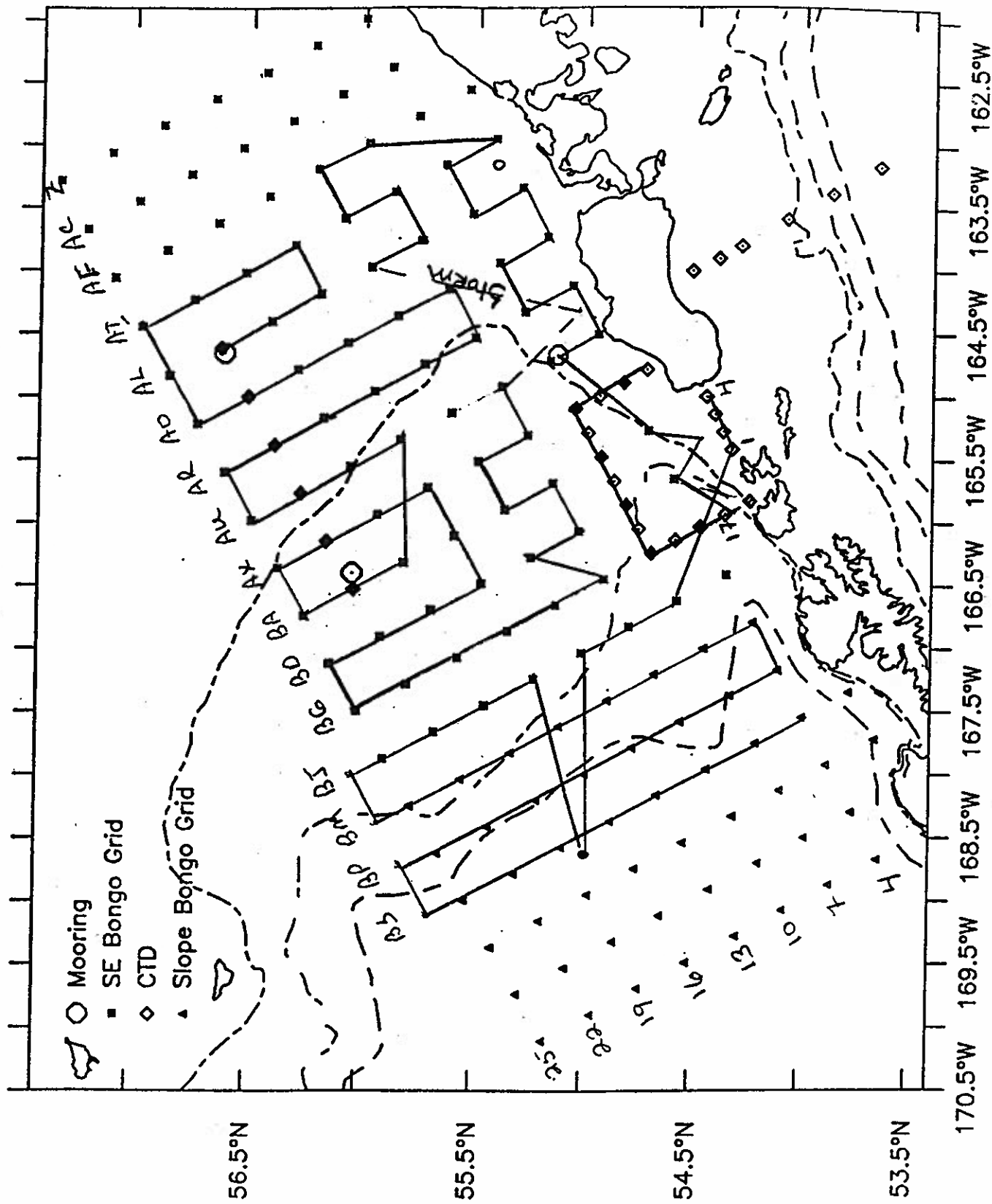
The temperature field reflects the recent presence of ice. Temperatures at 25m were less than 0 in the northeastern corner most recently covered by ice, and were less than 3 degrees almost everywhere except the outer slope: the area we did find larvae was the warmest area we surveyed. Bottom temperatures were warmer than near-surface temperatures, but they were also less than 3 degrees over much of the shelf.

Acknowledgements:

We'd like to acknowledge the competent help of the officers and crewmembers of the Miller Freeman. Without their knowledge of the ship, equipment, and area we would have accomplished none of our goals. We'd like to especially thank the people we worked with most closely: the survey and deck departments, and Rick Philips the ET, who were especially helpful. And we thank Bruce Thomassen for having such sharp eyes!

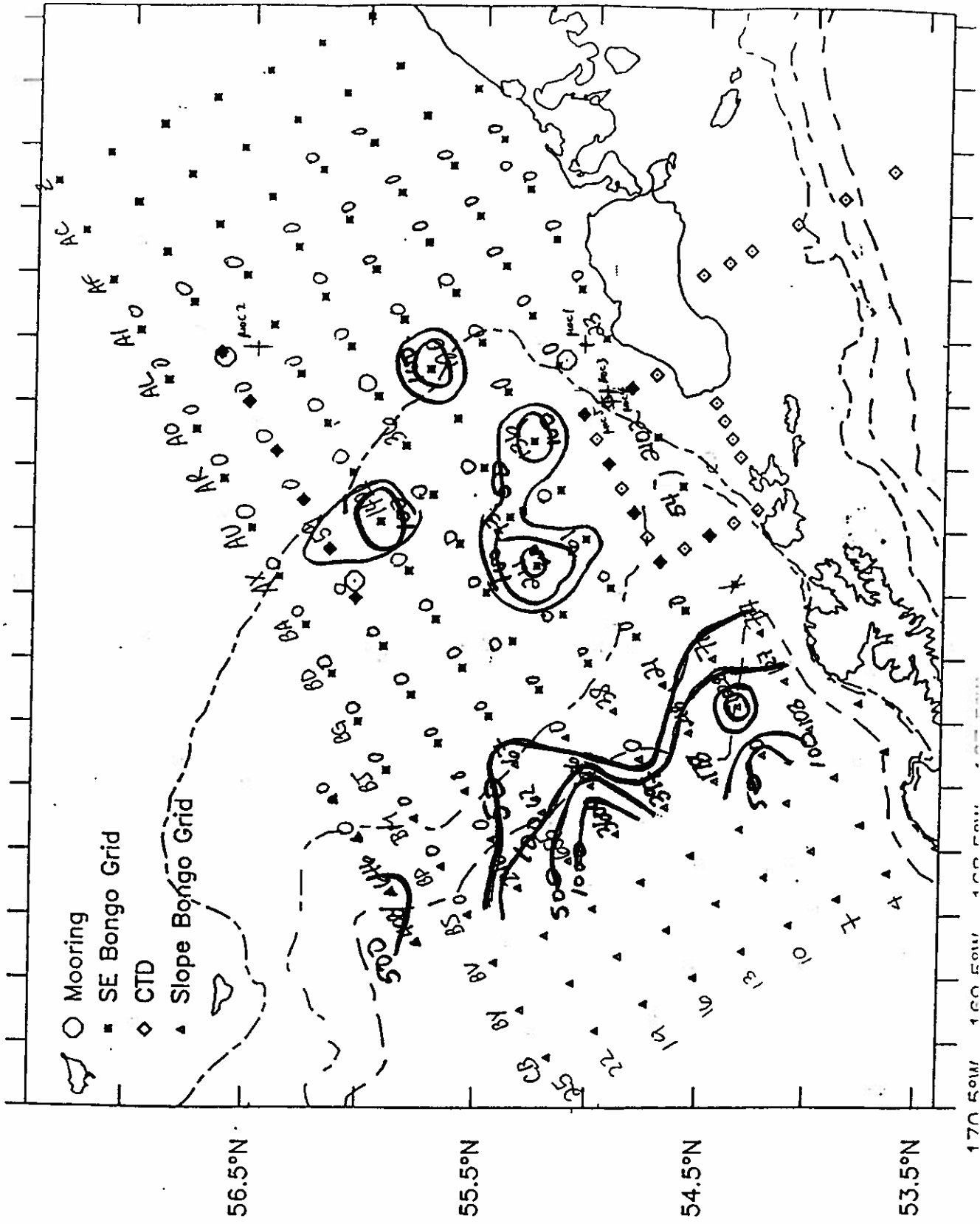
Recommendations:

The new SCS system is still being developed, and we expect problems both with the system and with learning to use it. One feature of the system which causes me problems is that the bongo seacat records are treated the same as the thermo-salinograph records. To find data from a bongo, it's necessary to search through a long file of bongo data separated by "garbage", one line a second, when the seacat was not on. This year, we discovered that the new program to read seacat_obs.scs files and output ascii files does not appear to write data into an output file, so we had to use the old routine to look at seacat data.



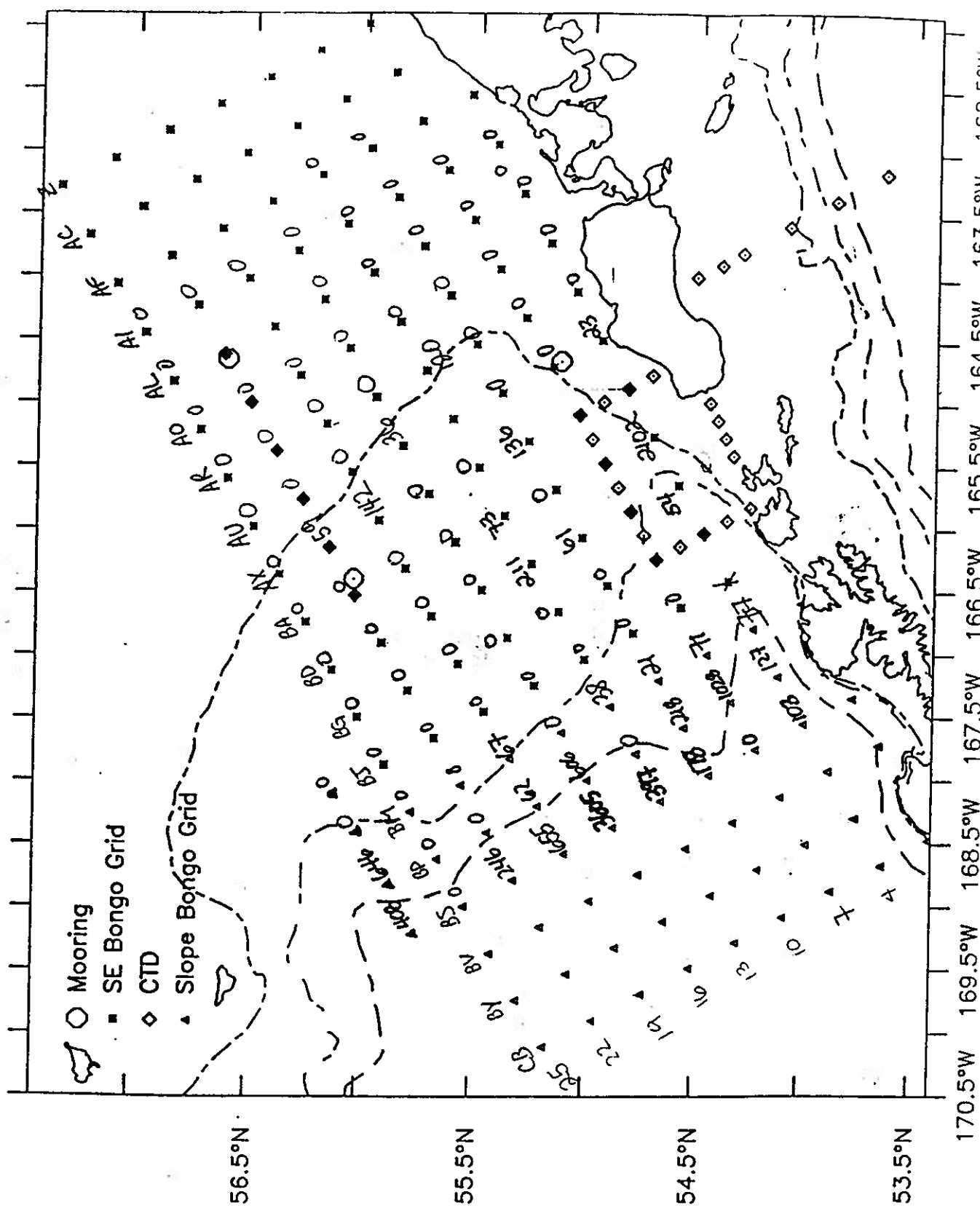
Master

Larvae #/10m²



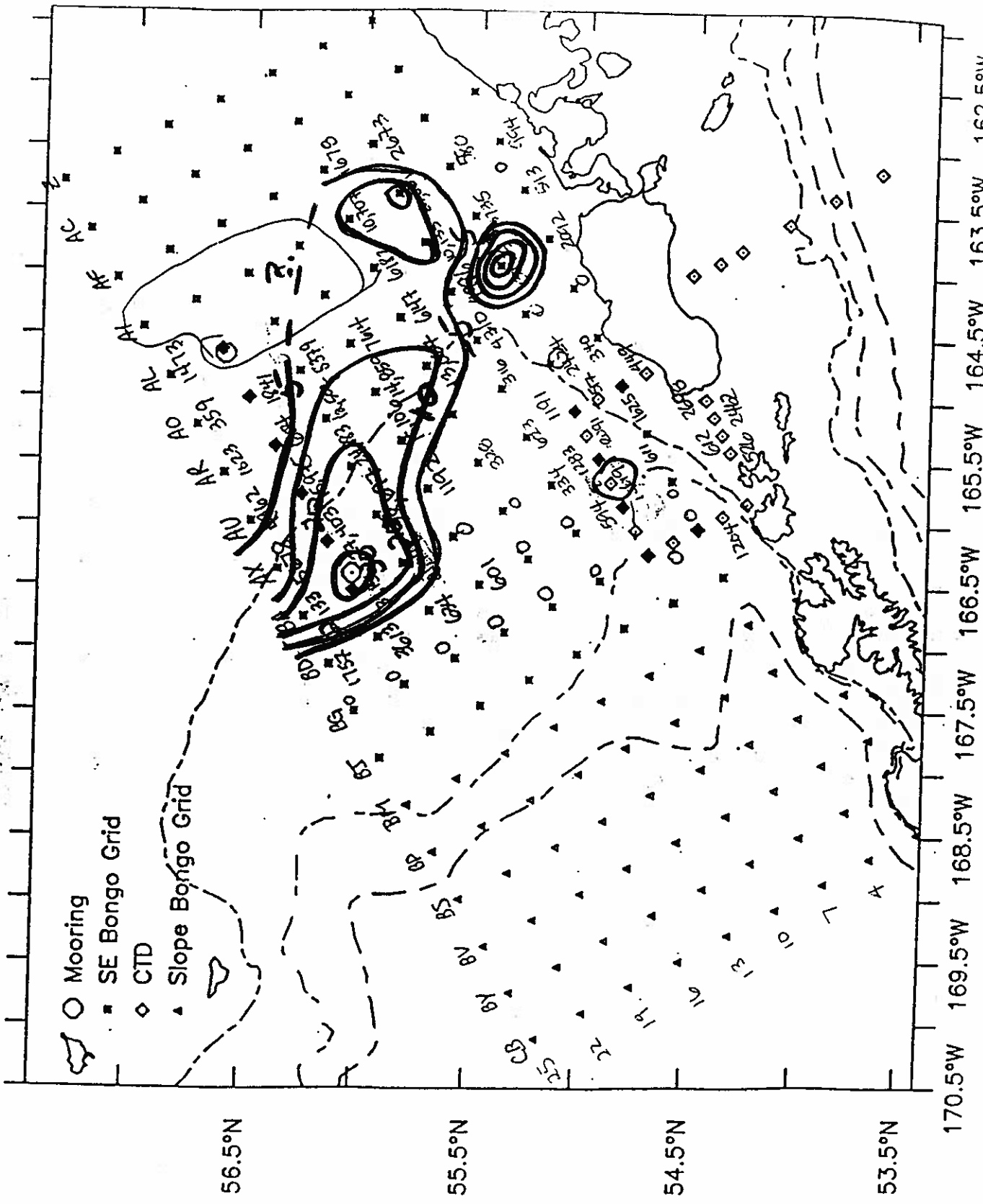
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Larvae #/10m²



MUSEY

Eggs # / 10 m²



170.5°W 169.5°W 168.5°W 167.5°W 166.5°W 165.5°W 164.5°W 163.5°W 162.5°W

56.5°N

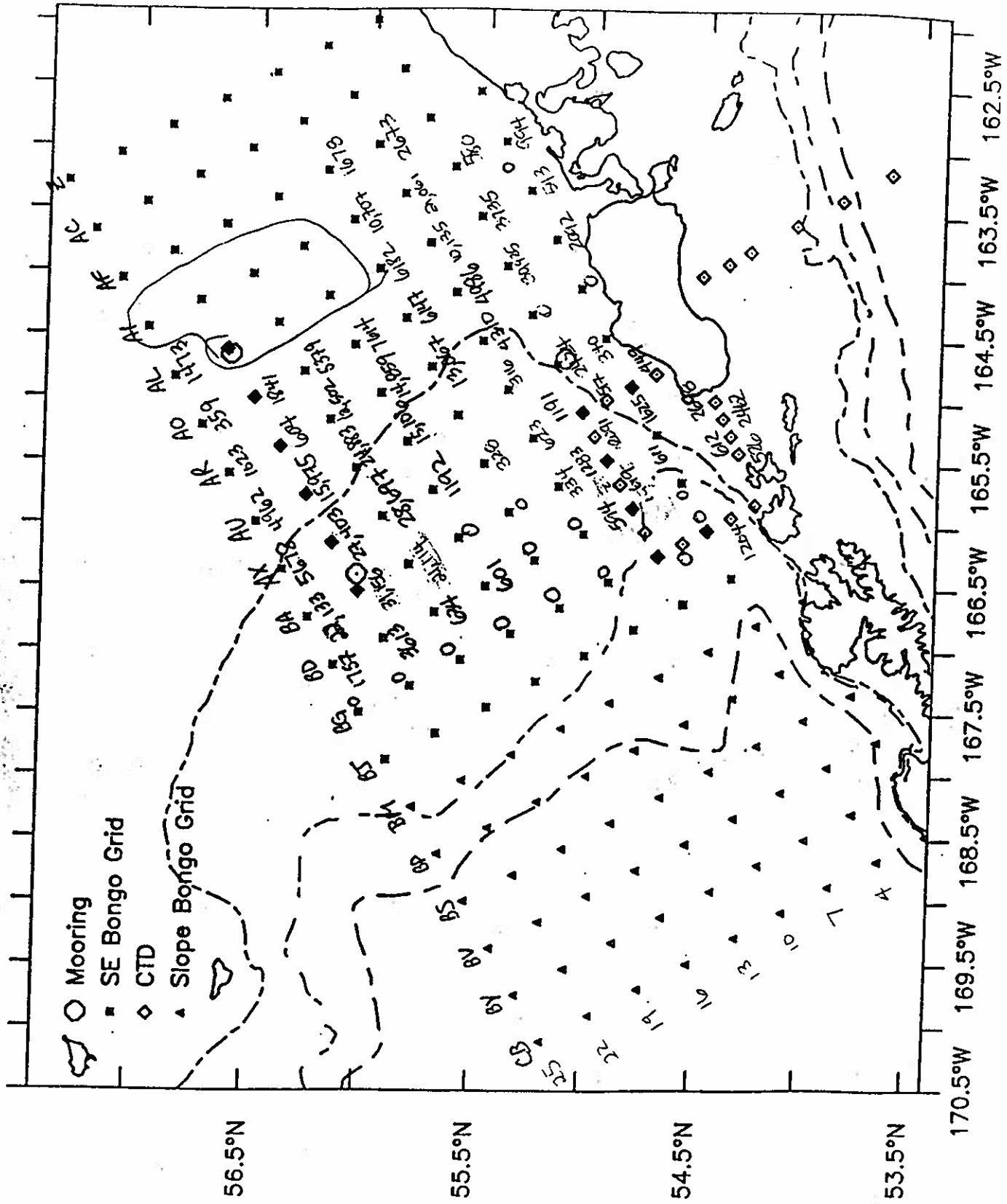
55.5°N

54.5°N

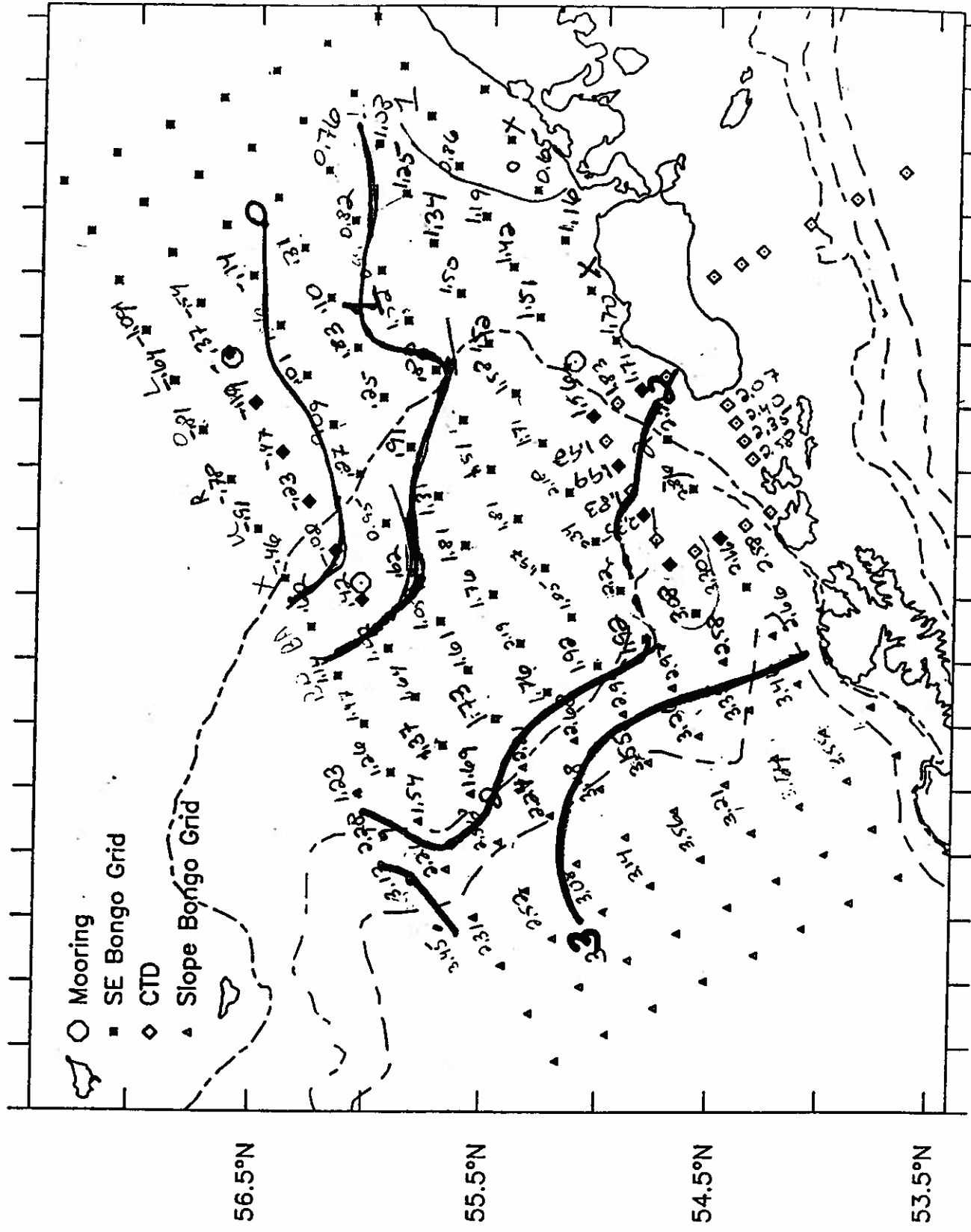
53.5°N

Master

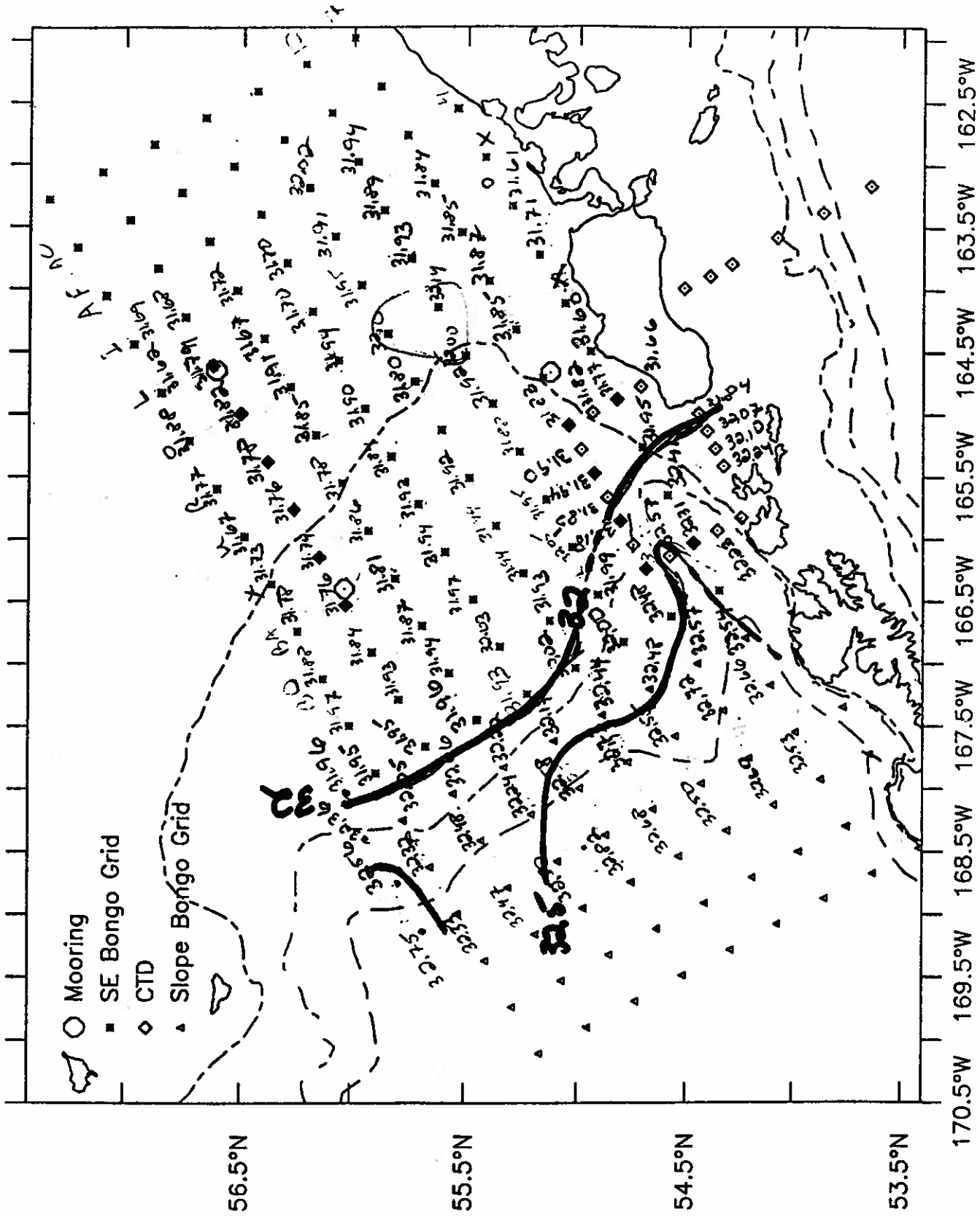
Eggs # / 10m²



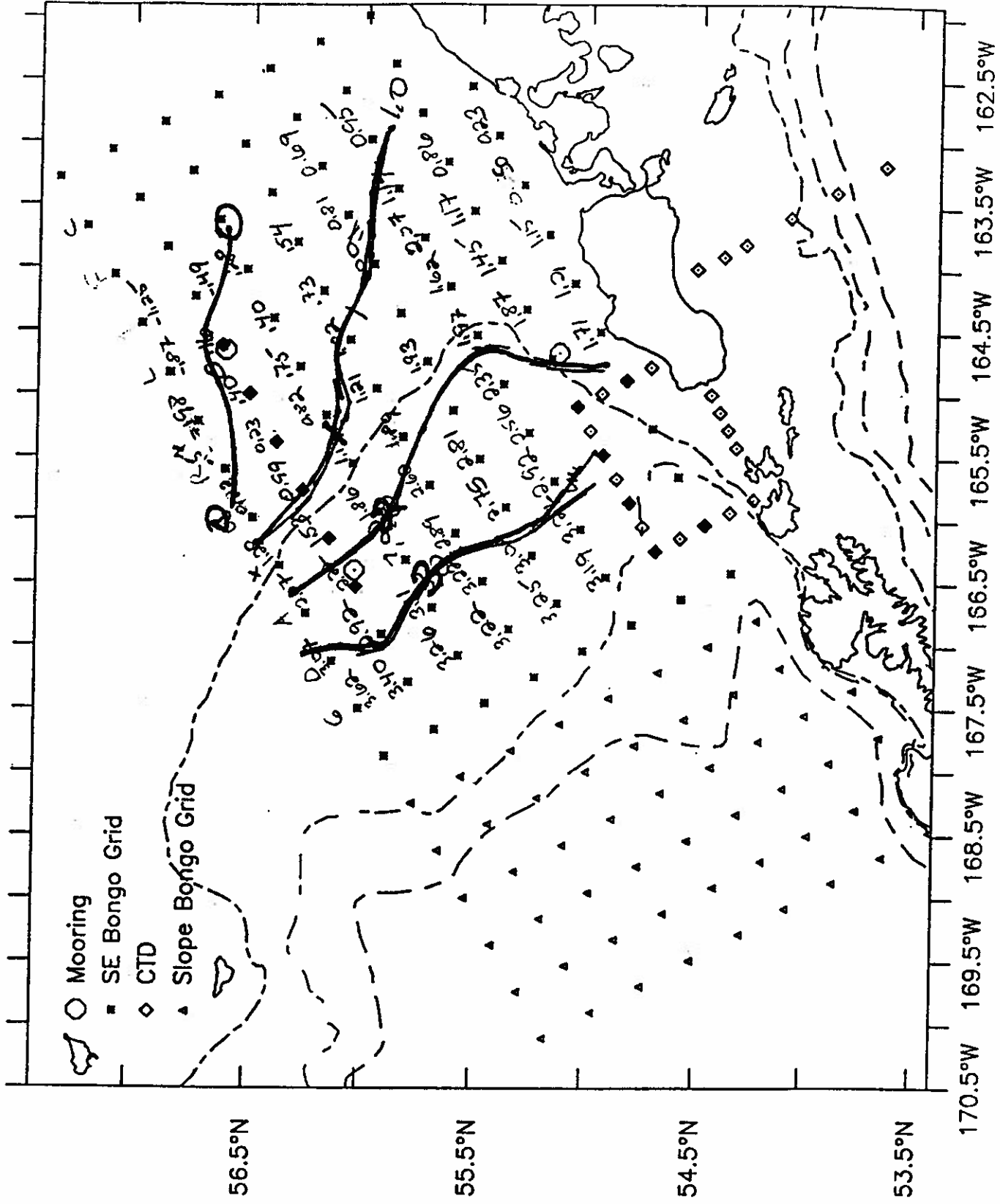
Temp. at 25 m



Salinity at 25m



Bottom Temp in shelf



Cruise Sampling Summary where Performance = Good or Quest
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Number of casts where absorption samples collected: 31
Number of absorption samples: 66
Number of dedicated ADCP transects: 1
Number of dedicated ADCP transect endings: 1
Number of tows where adults were taken for genetic samples: 0
Number of adults taken for genetic samples: -00-
Number of tows where adult stomachs were collected: 0
Number of stomachs taken from adult fish: -00-
Number of tows where adult fish were measured for
length/frequency analysis: 0
Number of adult fish measured for length/frequency analysis: -00-
Number of tows where adult fish otoliths were collected: 0
Number of adult fish from which otoliths were collected: -00-
Number of tows where adult fish weights were collected: 0
Number of adult fish from which weights were collected: -00-
Number of weather balloons released: 0
Number of BKG-calibration casts: 0
Number of tows where blood samples were collected from adult
pollock: 0
Number of pollock from which blood samples were collected: -00-
Number of CAT files saved: 133
Number of ChlAM casts: 44
Number of chlorophyll casts: 42
Number of chlorophyll samples: 167
Number of CTD casts (with & without bottles): 52
Number of discards: 107
Number of EBKG depth files saved: 0
Number of dedicated EK500 transect beginnings: 0
Number of dedicated EK500 transect endings: 0
Number of fluorescence casts: 50
Number of Furuno depth files saved: 0
Number of tows where juvenile pollock were taken for genetic
samples: 0
Number of juvenile pollock taken for genetic samples: -00-
Number of tows where juvenile pollock stomachs were taken: 0
Number of stomachs taken from juvenile pollock: -00-
Number of tows where juvenile pollock were measured for
length/frequency analysis: 0
Number of juvenile pollock measured for length/frequency
analysis: -00-

Cruise Sampling Summary where Performance = Good or Quest
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Number of tows where juvenile pollock were collected for
otolith analysis: 0
Number of juvenile pollock collected for otolith analysis: -00-
Number of tows where juvenile pollock were collected for
weight analysis: 0
Number of juvenile pollock collected for weight analysis: -00-
Number of hauls where larval pollock were collected for
biochemical analysis: 0
Number of larvae collected for biochemical analysis: -00-
Number of hauls where larval pollock were collected for
genetic analysis: 3
Number of larval pollock collected for genetic analysis: 98
Number of hauls where larval pollock were collected for
stomach analysis: 0
Number of larval pollock collected for stomach analysis: -00-
Number of hauls where larval pollock were collected for
histological analysis: 6
Number of larval pollock collected for histological analysis: 125
Number of hauls where live organisms were collected for
at sea experiments: 3
Number of hauls where larval pollock were collected for
muscle tissue DNA analysis: 5
Number of larval pollock collected for muscle tissue DNA
analysis: 50
Number of hauls where larval pollock were collected for
otolith analysis: 42
Number of larval pollock collected for otolith analysis: 514
Number of casts where samples preserved in Lugol's: 9
Number of Lugol's preserved samples: 13
Number of hauls where meristic analysis collections were
taken: 0
Number of fish collected for meristic analysis: -00-
Number of Microzooplankton casts: 26
Number of Microzooplankton samples: 125
Number of NetFluor files saved: 0
Number of Nutrient casts: 29
Number of Nutrient samples: 136
Number of tows where pollock ovaries were collected: 0
Number of pollock from which ovaries were removed: -00-
Number of PAR casts: 0

Cruise Sampling Summary where Performance = Good or Quest
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Number of casts where phytoplankton preserved in formalin: 15
Number of formalin preserved phytoplankton samples: 15
Number of Particulate Organic Carbon casts: 0
Number of Particulate Organic Carbon samples: -00-
Number of hauls where predators were collected: 10
Number of predators collected: 324
Number of nets preserved as QTOWF: 285
Number of sample jars used for formalin preservation: 286
Number of nets preserved as QTOWS: 0
Number of sample jars used for Stockard's preservation: -00-
Number of mooring deployments: 0
Number of mooring recoveries: 1
Number of satellite tracked buoy deployments: 1
Number of ScanMar depth files saved: 0
Number of hauls where SedTrap was deployed: -00-
Number of hauls where SedTrap was recovered: 0
Number of RADAR tracked buoy deployments: 2
Number of RADAR tracked buoy recoveries: 2
Number of hauls where larval pollock were collected
for shrinkage studies: 0
Number of larval pollock measured for shrinkage studies: -00-
Number of dedicated SSF transect beginnings: 0
Number of dedicated SSF transect endings: 0
Number of dedicated TSG transect beginnings: 0
Number of dedicated TSG transect endings: 0
Number of VideoCTD recordings saved: 0
Number of VideoNet recordings saved: 0
Number of Xbt casts: 0
Number of hauls where 20Bon was used: 28
Number of hauls where 60Bon was used: 137
Number of tows where Anchovy trawl was used: 0
Number of casts where bottles were used w/o CTD: 0
Number of hauls where CalVET was used: 5
Number of tows where Diamond trawl was used: 0
Number of tows where 83-112 bottom trawl was used: 0
Number of tows where IKMT was used: 0
Number of tows where IKS was used: 0
Number of hauls where 10" Clarke-Bumpus was used: 9
Number of hauls where 60Bon with taped codends was used: 15
Number of tows where Marinovich trawl was used: 0

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Cruise Sampling Summary where Performance = Good or Quest
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Number of tows where Methot was used: 0
Number of hauls where MOC1 was used: 5
Number of hauls where MOC2 was used: 0
Number of hauls where Neuston was used: 0
Number of tows where Nor'eastern bottom trawl was used: 0
Number of hauls where .75m ring net was used: 1
Number of hauls where 1 m ring net was used: 0
Number of tows where rope trawl was used: 0
Number of tows where shrimp trawl was used: 0
Number of tows where Tucker epibenthic sled was used: 0
Number of hauls where 4 7/8" Clarke-Bumpus was used: 0
Number of tows where Tuck1 was used: 22
Number of tows where Tuck3 was used: 0

Table 2

The columns in this table are: Station number, haul number, FOCI grid name, alternate station name (ie, CTD cast#, MOCNESS#), instrument or equipment used, date, time, latitude, and longitude.

Each instrument has its own line in the table; a tow that used two instruments such as a 60cm bongo and the Seacat will have two lines in the table.

Equipment listed is:

60bon: 60cm bongo, 333 mesh nets. Tows to 200m or 10 off bottom, unless a station also lists a 20cm bongo for the tow. In that case, tows are to 400m or 10 off bottom.

20bon: 20cm bongo, 135 mesh nets.

CalVet: CalVet nets to 60m.

CAT: Seacat pressure/temperature/salinity sensor

CTDB: Seabird CTD cast. Casts were generally to 100m or ten off bottom, except in the Unimak Pass box where all casts went to 10 off bottom.

Live: 60cm bongo, taped codends, tows to 70m

Tuck1: Tucker. First net 100m-60m. Second net 60m-surface at first patch. Nets at 70-30 and 30-surface in second patch.

Stn no.	Haul no.	Face Grid no.	Alt. Stn. None	Equip.	Date	Time	Lat.	Lon.
1	1	bs4	None	CAT	4/17/95	4:37:00	53.97883	167.572
1	1	bs4	None	Tuck1	4/17/95	4:37:00	53.97883	167.572
1	2	bs4	None	60Bon	4/17/95	5:49:00	53.995	167.5442
1	2	bs4	None	CAT	4/17/95	5:49:00	53.995	167.5442
2	1	bs7	None	CAT	4/17/95	7:57:00	54.2125	167.7442
2	1	bs7	None	60Bon	4/17/95	7:57:00	54.2125	167.7442
3	1	bs10	None	60Bon	4/17/95	10:07:00	54.43433	167.9418
3	1	bs10	None	CAT	4/17/95	10:07:00	54.43433	167.9418
3	2	bs10	ctd001	CTD	4/17/95	10:45:00	56.43383	167.9512
3	3	bs10	None	60Bon	4/17/95	11:28:00	54.42967	167.9372
3	3	bs10	None	CAT	4/17/95	11:28:00	54.42967	167.9372
3	4	bs10	ctd002	CTDB	4/17/95	12:21:00	54.43067	167.947
4	1	bs13	None	60Bon	4/17/95	14:21:00	54.66033	168.1515
4	1	bs13	None	CAT	4/17/95	14:21:00	54.66033	168.1515
4	2	bs13	None	Live	4/17/95	15:14:00	54.66267	168.1515
4	2	bs13	None	CAT	4/17/95	15:14:00	54.66267	168.1515
4	3	bs13	None	Live	4/17/95	15:39:00	54.66333	168.1512
4	3	bs13	None	CAT	4/17/95	15:39:00	54.66333	168.1512
4	4	bs13	None	CalVet	4/17/95	16:23:00	54.652	168.161
4	4	bs13	None	CAT	4/17/95	16:23:00	54.652	168.161
5	1	bs16	None	60Bon	4/17/95	18:00:00	54.873	168.3705
5	1	bs16	None	CAT	4/17/95	18:00:00	54.873	168.3705
6	1	bs19	None	CAT	4/17/95	19:51:00	55.0975	168.5762
6	1	bs19	None	60Bon	4/17/95	19:51:00	55.0975	168.5762
7	1	bs22	None	CAT	4/17/95	21:41:00	55.30967	168.7853
7	1	bs22	None	60Bon	4/17/95	21:41:00	55.30967	168.7853
7	2	bs22	ctd003	CTD	4/17/95	22:14:00	55.30917	168.7883
7	3	bs22	ctd004	CTDB	4/17/95	22:27:00	55.309	168.7842
8	1	bs25	None	CAT	4/18/95	0:12:00	55.53133	168.9953
8	1	bs25	None	60Bon	4/18/95	0:12:00	55.53133	168.9953
9	1	bs28	None	CAT	4/18/95	2:10:00	55.7535	169.2115
9	1	bs28	None	60Bon	4/18/95	2:10:00	55.7535	169.2115
10	1	bp28	None	60Bon	4/18/95	4:05:00	55.87283	168.8373
10	1	bp28	None	CAT	4/18/95	4:05:00	55.87283	168.8373
11	1	bp25	None	CAT	4/18/95	5:58:00	55.6495	168.6227
11	1	bp25	None	60Bon	4/18/95	5:58:00	55.6495	168.6227
12	1	bp22	None	60Bon	4/18/95	7:50:00	55.42733	168.4145
12	1	bs22	None	CAT	4/18/95	8:22:00	55.4285	168.4072
12	2	bs22	ctd005	CTDB	4/18/95	8:22:00	55.4285	168.4072
13	1	bp19	None	CAT	4/18/95	10:07:00	55.20733	168.2058
13	1	bp19	None	60Bon	4/18/95	10:07:00	55.20733	168.2058
14	1	bp16	None	CAT	4/18/95	11:58:00	54.99367	168.0007
14	1	bp16	None	60Bon	4/18/95	11:58:00	54.99367	168.0007
15	1	bp13	None	CAT	4/18/95	14:00:00	54.77383	167.7782
15	1	bp13	None	60Bon	4/18/95	14:00:00	54.77383	167.7782
16	1	bp10	None	60Bon	4/18/95	15:30:00	54.54933	167.5793
16	1	bp10	None	CAT	4/18/95	15:30:00	54.54933	167.5793
16	2	bp10	ctd006	CTDB	4/18/95	15:57:00	54.54567	167.5782
16	3	bp10	None	CAT	4/18/95	16:37:00	54.54117	167.581
16	3	bp10	None	20Bon	4/18/95	16:37:00	54.54117	167.581
16	3	bp10	None	60Bon	4/18/95	16:37:00	54.54117	167.581

17	1	bp7	None	CAT	4/18/95	18:37:00	54.32683	167.3752
17	1	bp7	None	60Bon	4/18/95	18:37:00	54.32683	167.3752
18	1	bp4	None	60Bon	4/18/95	19:59:00	54.10983	167.1745
18	1	bp4	None	CAT	4/18/95	19:59:00	54.10983	167.1745
18	2	bp4	None	Live	4/18/95	20:27:00	54.10983	167.173
18	2	bp4	None	CAT	4/18/95	20:27:00	54.10983	167.173
19	1	bm4	None	60Bon	4/18/95	22:07:00	54.2285	166.7868
19	1	bm4	None	CAT	4/18/95	22:07:00	54.2285	166.7868
20	1	bm7	None	60Bon	4/19/95	0:00:00	54.44633	167.0038
20	1	bm7	None	CAT	4/19/95	0:00:00	54.44633	167.0038
21	1	bm10	None	60Bon	4/19/95	1:51:00	54.666	167.2057
21	1	bm10	None	CAT	4/19/95	1:51:00	54.666	167.2057
21	2	bm10	None	60Bon	4/19/95	2:40:00	54.67	167.2108
21	2	bm10	None	CAT	4/19/95	2:40:00	54.67	167.2108
21	2	bm10	None	20Bon	4/19/95	2:40:00	54.67	167.2108
22	1	bm13	None	CAT	4/19/95	4:20:00	54.8945	167.4093
22	1	bm13	None	60Bon	4/19/95	4:20:00	54.8945	167.4093
23	1	bm16	None	60Bon	4/19/95	6:25:00	55.10683	167.6162
23	1	bm16	None	CAT	4/19/95	6:25:00	55.10683	167.6162
24	1	bm19	None	60Bon	4/19/95	8:29:00	55.32867	167.828
24	1	bm19	None	CAT	4/19/95	8:29:00	55.32867	167.828
25	1	bm22	None	60Bon	4/19/95	10:26:00	55.5505	168.0373
25	1	bm22	None	CAT	4/19/95	10:26:00	55.5505	168.0373
26	1	bm25	None	CAT	4/19/95	12:13:00	55.77033	168.2555
26	1	bm25	None	60Bon	4/19/95	12:13:00	55.77033	168.2555
27	1	bm28	None	60Bon	4/19/95	14:02:00	55.99133	168.47
27	1	bm28	None	CAT	4/19/95	14:02:00	55.99133	168.47
28	1	bj28	None	60Bon	4/19/95	15:46:00	56.1105	168.0883
28	1	bj28	None	CAT	4/19/95	15:46:00	56.1105	168.0883
29	1	bj25	None	60Bon	4/19/95	17:40:00	55.893	167.8778
29	1	bj25	None	CAT	4/19/95	17:40:00	55.893	167.8778
30	1	bj22	None	60Bon	4/19/95	19:08:00	55.67	167.6642
30	1	bj22	None	CAT	4/19/95	19:08:00	55.67	167.6642
30	2	bj22	ctd007	CTDB	4/19/95	19:32:00	55.6725	167.6605
31	1	bj19	None	60Bon	4/19/95	21:15:00	55.44783	167.4448
31	1	bj19	None	CAT	4/19/95	21:15:00	55.44783	167.4448
32	1	bj16	None	60Bon	4/19/95	22:50:00	55.22717	167.241
32	1	bj16	None	CAT	4/19/95	22:50:00	55.22717	167.241
33	1	None	None	60Bon	4/20/95	3:11:00	54.87183	168.3622
34	1	None	None	60Bon	4/20/95	4:17:00	54.98083	168.473
35	1	None	None	60Bon	4/20/95	5:21:00	54.92083	168.6587
36	1	None	None	60Bon	4/20/95	6:04:00	54.97567	168.7068
37	1	None	None	60Bon	4/20/95	6:50:00	55.03	168.7675
38	1	None	None	ShipBuoy	4/20/95	7:57:00	54.97733	168.7138
39	1	None	None	LG-CB	4/20/95	9:07:00	54.97967	168.7255
39	1	None	None	Tuck1	4/20/95	9:07:00	54.97967	168.7255
39	2	None	None	LG-CB	4/20/95	9:56:00	54.9775	168.7352
39	2	None	None	Tuck1	4/20/95	9:56:00	54.9775	168.7352
40	1	None	ctd008	CTD	4/20/95	10:47:00	54.976	168.755
40	1	None	ctd008	CalVet	4/20/95	10:47:00	54.976	168.755
41	1	None	None	Live	4/20/95	11:28:00	54.96983	168.7727

41	2	None	None	Live	4/20/95	11:57:00	54.96817	168.7852
41	3	None	ctd009	CTD	4/20/95	12:32:00	54.97	168.7955
42	1	None	None	Tuck1	4/20/95	18:17:00	54.93417	168.9403
42	1	None	None	LG-CB	4/20/95	18:17:00	54.93417	168.9403
43	1	None	None	Tuck1	4/20/95	19:18:00	54.93267	168.9728
43	1	None	None	LG-CB	4/20/95	19:18:00	54.93267	168.9728
44	1	None	None	Live	4/20/95	19:59:00	54.929	168.9753
44	2	None	None	Live	4/20/95	20:12:00	54.9275	168.9808
45	1	None	None	Live	4/20/95	20:39:00	54.92133	169.0003
46	1	None	None	Tuck1	4/20/95	22:03:00	54.92317	169.0227
46	2	None	None	Tuck1	4/20/95	22:21:00	54.923	169.0285
46	3	None	None	Tuck1	4/20/95	22:42:00	54.92033	169.0357
47	1	None	None	Tuck1	4/20/95	23:08:00	54.92033	169.044
47	2	None	None	Tuck1	4/20/95	23:33:00	54.91767	169.051
47	3	None	None	Tuck1	4/21/95	0:01:00	54.9175	169.0608
48	1	None	ctd010	CTDB	4/21/95	0:41:00	54.92067	169.0447
48	2	None	ctd011	CTDB	4/21/95	1:14:00	54.92067	169.0477
49	1	None	None	Tuck1	4/21/95	1:48:00	54.90833	169.0923
49	2	None	None	Tuck1	4/21/95	2:05:00	54.90517	169.0972
49	3	None	None	Tuck1	4/21/95	2:22:00	54.90217	169.1035
49	4	None	None	Tuck1	4/21/95	2:44:00	54.9005	169.1078
49	5	None	None	Tuck1	4/21/95	3:12:00	54.8955	169.1147
49	6	None	None	Tuck1	4/21/95	3:35:00	54.89317	169.1212
50	1	None	ctd012	CTDB	4/21/95	4:09:00	54.90033	169.113
50	2	None	ctd013	CTDB	4/21/95	4:47:00	54.901	169.1155
50	3	None	None	ShipBuoy	4/21/95	5:25:00	52.87533	169.1598
51	1	bj13	None	CAT	4/21/95	12:02:00	55.0075	167.0338
51	1	bj13	None	60Bon	4/21/95	12:02:00	55.0075	167.0338
52	1	bj10	None	20Bon	4/21/95	13:53:00	54.78867	166.827
52	1	bj10	None	CAT	4/21/95	13:53:00	54.78867	166.827
52	1	bj10	None	60Bon	4/21/95	13:53:00	54.78867	166.827
52	2	bj10	None	CAT	4/21/95	14:30:00	54.7865	166.8215
52	2	bj10	None	60Bon	4/21/95	14:30:00	54.7865	166.8215
52	3	bj10	None	Live	4/21/95	14:51:00	54.78983	166.8283
53	1	bj7	None	60Bon	4/21/95	16:29:00	54.57117	166.6273
53	1	bj7	None	CAT	4/21/95	16:29:00	54.57117	166.6273
54	1	None	None	CAT	4/21/95	20:48:00	54.32967	165.4072
54	1	None	None	20Bon	4/21/95	20:48:00	54.32967	165.4072
54	1	None	None	60Bon	4/21/95	20:48:00	54.32967	165.4072
54	2	None	CTD014	CTDB	4/21/95	22:00:00	54.33083	165.4078
54	3	None	CTD015	CTDB	4/21/95	22:30:00	54.3315	165.4138
55	1	None	None	60Bon	4/22/95	0:07:00	54.3705	165.2685
55	1	None	None	20Bon	4/22/95	0:07:00	54.3705	165.2685
55	1	None	None	CAT	4/22/95	0:07:00	54.3705	165.2685
55	2	None	ctd016	CTDB	4/22/95	0:56:00	54.37083	165.2652
56	1	None	ctd017	CTDB	4/22/95	2:00:00	54.41083	165.1378
56	2	None	None	60Bon	4/22/95	2:30:00	54.41083	165.1308
56	2	None	None	20Bon	4/22/95	2:30:00	54.41083	165.1308
56	2	None	None	CAT	4/22/95	2:30:00	54.41083	165.1308
57	1	None	ctd018	CTDB	4/22/95	3:33:00	54.43217	164.9545
57	2	None	None	60Bon	4/22/95	3:49:00	54.44483	164.962

57	2	None	None	CAT	4/22/95	3:49:00	54.44483	164.962
57	2	None	None	20Bon	4/22/95	3:49:00	54.44483	164.962
58	1	None	ctd019	CTDB	4/22/95	5:54:00	54.71417	164.7753
58	2	None	None	20Bon	4/22/95	6:23:00	54.71733	164.7695
58	2	None	None	60Bon	4/22/95	6:23:00	54.71733	164.7695
58	2	None	None	CAT	4/22/95	6:23:00	54.71733	164.7695
59	1	None	ctd020	CTDB	4/22/95	7:19:00	54.83217	164.883
59	2	None	None	20Bon	4/22/95	7:41:00	54.999	164.877
59	2	None	None	60Bon	4/22/95	7:41:00	54.999	164.877
59	2	None	None	CAT	4/22/95	7:41:00	54.999	164.877
60	1	None	ctd021	CTDB	4/22/95	8:43:00	54.93983	164.9877
60	2	None	None	60Bon	4/22/95	9:39:00	54.94067	164.9912
60	2	None	None	CAT	4/22/95	9:39:00	54.94067	164.9912
60	2	None	None	20Bon	4/22/95	9:39:00	54.94067	164.9912
61	1	None	ctd022	CTDB	4/22/95	10:48:00	55.04583	165.0973
61	2	None	None	20Bon	4/22/95	11:15:00	55.047	165.09
61	2	None	None	60Bon	4/22/95	11:15:00	55.047	165.09
61	2	None	None	CAT	4/22/95	11:15:00	55.047	165.09
61	3	None	ctd022	CTDB	4/22/95	11:41:00	55.04333	165.0923
62	1	None	ctd023	CTDB	4/22/95	12:56:00	54.98667	165.2048
62	2	None	None	60Bon	4/22/95	13:32:00	54.659	165.288
62	2	None	None	20Bon	4/22/95	13:32:00	54.659	165.288
62	2	None	None	CAT	4/22/95	13:32:00	54.659	165.288
63	1	None	ctd024	CTDB	4/22/95	14:37:00	54.92633	165.4798
63	2	None	None	CAT	4/22/95	15:03:00	54.9225	165.4717
63	2	None	None	20Bon	4/22/95	15:03:00	54.9225	165.4717
63	2	None	None	60Bon	4/22/95	15:03:00	54.9225	165.4717
64	1	None	ctd025	CTDB	4/22/95	16:05:00	54.868	165.676
64	2	None	None	CAT	4/22/95	16:36:00	54.86217	165.6645
64	2	None	None	20Bon	4/22/95	16:36:00	54.86217	165.6645
64	2	None	None	60Bon	4/22/95	16:36:00	54.86217	165.6645
65	1	None	ctd026	CTDB	4/22/95	17:45:00	54.81367	165.86
65	2	None	None	CAT	4/22/95	18:13:00	54.79917	165.8728
65	2	None	None	20Bon	4/22/95	18:13:00	54.79917	165.8728
65	2	None	None	60Bon	4/22/95	18:13:00	54.79917	165.8728
66	1	None	ctd027	CTD	4/22/95	19:21:00	54.75017	166.0475
67	1	None	ctd028	CTD	4/22/95	20:33:00	54.69083	166.235
68	1	None	ctd029	CTDB	4/22/95	21:49:00	54.58183	166.13
68	2	None	ctd030	CTDB	4/22/95	22:23:00	54.579	166.1353
68	3	None	None	20Bon	4/22/95	22:46:00	54.57883	166.1355
68	3	None	None	60Bon	4/22/95	22:46:00	54.57883	166.1355
68	3	None	None	CAT	4/22/95	22:46:00	54.57883	166.1355
69	1	None	ctd031	CTDB	4/23/95	0:30:00	54.47917	166.0432
69	2	None	ctd032	CTDB	4/23/95	1:08:00	54.4745	166.042
69	3	None	None	60Bon	4/23/95	1:35:00	54.4705	166.0467
69	3	None	None	CAT	4/23/95	1:35:00	54.4705	166.0467
69	3	None	None	20Bon	4/23/95	1:35:00	54.4705	166.0467
70	1	None	ctd033	CTDB	4/23/95	3:07:00	54.35967	165.9438
70	2	None	ctd034	CTDB	4/23/95	3:40:00	54.359	165.9432
70	3	None	None	20Bon	4/23/95	4:13:00	54.359	165.9415
70	3	None	None	CAT	4/23/95	4:13:00	54.359	165.9415

70	3	None	None	60Bon	4/23/95	4:13:00	54.359	165.9415
71	1	bd14	None	60Bon	4/23/95	6:19:00	54.58517	165.6472
71	1	bd14	None	CAT	4/23/95	6:19:00	54.58517	165.6472
72	1	None	None	SatBuoy	4/23/95	7:36:00	54.487	165.4513
73	1	ba4	None	60Bon	4/23/95	9:06:00	54.71033	165.2712
73	1	ba4	None	CAT	4/23/95	9:06:00	54.71033	165.2712
74	1	None	None	60Bon	4/23/95	13:04:00	55.073	164.5245
74	1	None	None	CAT	4/23/95	13:04:00	55.073	164.5245
74	2	None	ctd035	CTDB	4/23/95	13:46:00	55.06767	164.5383
74	3	None	None	60Bon	4/23/95	14:19:00	55.07067	164.5247
74	3	None	None	20Bon	4/23/95	14:19:00	55.07067	164.5247
74	3	None	None	CAT	4/23/95	14:19:00	55.07067	164.5247
74	4	None	ctd036	CTDB	4/23/95	16:16:00	55.06617	164.5375
74	5	None	None	Live	4/23/95	16:50:00	55.07367	164.5308
74	6	None	moc001	MOC1	4/23/95	18:49:00	55.07083	164.5317
75	1	au4	None	CAT	4/23/95	19:58:00	54.949	164.5027
75	1	au4	None	60Bon	4/23/95	19:58:00	54.949	164.5027
76	1	ar4	None	CAT	4/23/95	21:18:00	54.06717	164.1228
76	1	ar4	None	60Bon	4/23/95	21:18:00	54.06717	164.1228
77	1	ar7	None	CAT	4/23/95	22:50:00	55.28967	164.3277
77	1	ar7	None	60Bon	4/23/95	22:50:00	55.28967	164.3277
78	1	ao7	None	CAT	4/24/95	0:25:00	55.4035	163.9362
78	1	ao7	None	60Bon	4/24/95	0:25:00	55.4035	163.9362
79	1	ao4	None	CAT	4/24/95	2:02:00	55.18617	163.7267
79	1	ao4	None	60Bon	4/24/95	2:02:00	55.18617	163.7267
80	1	al4	None	CAT	4/24/95	3:40:00	55.30433	163.3382
80	1	al4	None	60Bon	4/24/95	3:40:00	55.30433	163.3382
81	1	al7	None	60Bon	4/24/95	5:17:00	55.52283	163.548
82	1	ai7	None	60Bon	4/24/95	7:08:00	55.64317	163.1623
82	1	ai7	None	CAT	4/24/95	7:08:00	55.64317	163.1623
83	1	ai4	None	CAT	4/24/95	8:44:00	55.42533	162.9477
83	1	ai4	None	60Bon	4/24/95	8:44:00	55.42533	162.9477
84	1	af10	None	CAT	4/24/95	11:57:00	55.98317	162.9787
84	1	af10	None	60Bon	4/24/95	11:57:00	55.98317	162.9787
84	2	af10	None	20Bon	4/24/95	12:28:00	55.98317	162.98
84	2	af10	None	CAT	4/24/95	12:28:00	55.98317	162.98
84	2	af10	None	60Bon	4/24/95	12:28:00	55.98317	162.98
85	1	af13	None	CAT	4/24/95	14:18:00	56.20233	163.1932
85	1	af13	None	60Bon	4/24/95	14:18:00	56.20233	163.1932
86	1	ai13	None	CAT	4/24/95	16:01:00	56.08533	163.5868
86	1	ai13	None	60Bon	4/24/95	16:01:00	56.08533	163.5868
87	2	Al10	None	20Bon	4/24/95	17:50:00	55.86283	164.3703
87	2	ai10	None	60Bon	4/24/95	17:50:00	55.86283	164.3703
87	2	ai10	None	CAT	4/24/95	17:50:00	55.86283	164.3703
87	1	ai10	None	60Bon	4/24/95	18:15:00	55.87067	163.375
87	1	ai10	None	CAT	4/24/95	18:15:00	55.87067	163.375
88	1	ai10	None	CAT	4/24/95	20:06:00	55.74317	163.7597
88	1	ai10	None	60Bon	4/24/95	20:06:00	55.74317	163.7597
88	2	ai10	ctd037	CTDB	4/24/95	21:03:00	55.74283	163.7625
89	1	AL13	None	60Bon	4/24/95	22:38:00	55.96617	163.9747
89	1	al13	None	CAT	4/24/95	22:38:00	55.96617	163.9747

90	1	au10	ctd038	CTDB	4/25/95	23:36:00	55.38517	164.9163
90	2	au10	None	CAT	4/26/95	0:04:00	55.38517	164.9137
90	2	au10	None	60Bon	4/26/95	0:04:00	55.38517	164.9137
90	3	au10	None	20Bon	4/26/95	0:24:00	55.38467	164.9102
90	3	au10	None	CAT	4/26/95	0:24:00	55.38467	164.9102
90	3	au10	None	60Bon	4/26/95	0:24:00	55.38467	164.9102
91	1	ax10	None	60Bon	4/26/95	2:18:00	55.26583	165.3037
91	1	ax10	None	CAT	4/26/95	2:18:00	55.26583	165.3037
91	1	ax10	None	20Bon	4/26/95	2:18:00	55.26583	165.3037
92	1	ax13	None	CAT	4/26/95	4:02:00	55.48433	165.5133
92	1	ax13	None	60Bon	4/26/95	4:02:00	55.48433	165.5133
93	1	ba13	None	60Bon	4/26/95	5:46:00	55.36733	165.8947
93	1	ba13	None	CAT	4/26/95	5:46:00	55.36733	165.8947
94	1	ba10	ctd039	CTDB	4/26/95	7:28:00	55.14967	165.6847
94	2	ba10	None	20Bon	4/26/95	7:46:00	55.148	165.6887
94	2	ba10	None	CAT	4/26/95	7:46:00	55.148	165.6887
94	2	ba10	None	60Bon	4/26/95	7:46:00	55.148	165.6887
95	1	bd10	None	CAT	4/26/95	9:41:00	55.029	166.0657
95	1	bd10	None	60Bon	4/26/95	9:41:00	55.029	166.0657
96	1	bd13	None	CAT	4/26/95	11:33:00	55.24483	166.2767
96	1	bd13	None	60Bon	4/26/95	11:33:00	55.24483	166.2767
96	2	bd13	None	Live	4/26/95	11:57:00	55.23967	166.2718
96	2	bd13	None	CAT	4/26/95	11:57:00	55.23967	166.2718
96	3	bd13	None	Live	4/26/95	12:19:00	55.2415	166.2735
96	3	bd13	None	CAT	4/26/95	12:19:00	55.2415	166.2735
96	4	bd13	None	CAT	4/26/95	12:43:00	55.24183	166.2618
96	4	bd13	None	Cal/Vet	4/26/95	12:43:00	55.24183	166.2618
97	1	bg10	None	CAT	4/26/95	14:47:00	54.90717	166.4482
97	1	bg10	None	60Bon	4/26/95	14:47:00	54.90717	166.4482
97	1	bg10	None	20Bon	4/26/95	14:47:00	54.90717	166.4482
98	1	bg13	None	CAT	4/26/95	16:35:00	55.12717	166.667
98	1	bg13	None	60Bon	4/26/95	16:35:00	55.12717	166.667
99	1	bg16	None	CAT	4/26/95	18:18:00	55.344	166.8702
99	1	bg16	None	60Bon	4/26/95	18:18:00	55.344	166.8702
100	1	bg19	None	60Bon	4/26/95	19:54:00	55.56883	167.0797
100	1	bg19	None	CAT	4/26/95	19:54:00	55.56883	167.0797
101	1	bg22	None	60Bon	4/26/95	21:25:00	55.788	167.309
101	1	bg22	None	CAT	4/26/95	21:25:00	55.788	167.309
102	1	BG25	None	60Bon	4/26/95	22:55:00	56.00783	167.4952
102	1	BG25	None	CAT	4/26/95	22:55:00	56.00783	167.4952
103	1	BD25	None	60Bon	4/27/95	0:24:00	56.12883	167.1262
103	1	BD25	None	CAT	4/27/95	0:24:00	56.12883	167.1262
104	1	BD22	None	60Bon	4/27/95	2:00:00	55.9065	166.9128
104	1	BD22	None	CAT	4/27/95	2:00:00	55.9065	166.9128
105	1	BD19	None	60Bon	4/27/95	3:37:00	55.68733	166.7022
105	1	BD19	None	CAT	4/27/95	3:37:00	55.68733	166.7022
106	1	BD16	None	60Bon	4/27/95	5:16:00	55.46683	166.4873
106	1	BD16	None	CAT	4/27/95	5:16:00	55.46683	166.4873
107	1	BA16	None	60Bon	4/27/95	6:58:00	55.55417	166.107
107	1	BA16	None	CAT	4/27/95	6:58:00	55.55417	166.107
108	1	ax16	None	CAT	4/27/95	8:39:00	55.70583	165.7238

108	1	ax16	None	60Bon	4/27/95	8:39:00	55.70583	165.7238
109	1	ax19	None	CAT	4/27/95	10:18:00	55.92733	165.9367
109	1	ax19	None	60Bon	4/27/95	10:18:00	55.92733	165.9367
110	1	ax22	None	CAT	4/27/95	11:59:00	56.1475	166.152
110	1	ax22	None	60Bon	4/27/95	11:59:00	56.1475	166.152
111	1	ax25	None	CAT	4/27/95	13:36:00	56.36717	166.363
111	1	ax25	None	60Bon	4/27/95	13:36:00	56.36717	166.363
112	1	ba25	None	60Bon	4/27/95	15:09:00	56.24567	166.74
112	1	ba25	None	CAT	4/27/95	15:09:00	56.24567	166.74
113	1	ba22	None	CAT	4/27/95	16:38:00	56.02133	166.5288
113	1	ba22	None	60Bon	4/27/95	16:38:00	56.02133	166.5288
114	1	ba19	None	60Bon	4/27/95	23:30:00	55.80367	166.3165
114	1	ba19	None	CAT	4/27/95	23:30:00	55.80367	166.3165
115	1	au16	None	60Bon	4/28/95	2:30:00	55.82283	165.3418
115	1	au16	None	CAT	4/28/95	2:30:00	55.82283	165.3418
116	1	au19	None	60Bon	4/28/95	4:09:00	56.0445	165.554
116	1	au19	None	CAT	4/28/95	4:09:00	56.0445	165.554
117	1	au22	None	60Bon	4/28/95	5:48:00	56.266	165.7697
117	1	au22	None	CAT	4/28/95	5:48:00	56.266	165.7697
118	1	au25	None	60Bon	4/28/95	7:30:00	56.48667	165.9838
118	1	au25	None	CAT	4/28/95	7:30:00	56.48667	165.9838
119	1	ar25	None	CAT	4/28/95	9:06:00	56.60583	165.6047
119	1	ar25	None	60Bon	4/28/95	9:06:00	56.60583	165.6047
120	1	ar22	ctd040	CTDB	4/28/95	11:22:00	56.38683	165.3853
120	2	ar22	None	60Bon	4/28/95	11:43:00	56.38633	165.3898
120	2	ar22	None	CAT	4/28/95	11:43:00	56.38633	165.3898
121	1	ar19	None	CAT	4/28/95	13:30:00	56.16783	165.1733
121	1	ar19	None	60Bon	4/28/95	13:30:00	56.16783	165.1733
122	1	ar16	None	CAT	4/28/95	14:59:00	55.94333	164.9572
122	1	ar16	None	60Bon	4/28/95	14:59:00	55.94333	164.9572
123	1	ar13	None	CAT	4/28/95	16:37:00	55.7245	164.7447
123	1	ar13	None	60Bon	4/28/95	16:37:00	55.7245	164.7447
124	1	ar10	None	CAT	4/28/95	18:14:00	55.507	164.532
124	1	ar10	None	60Bon	4/28/95	18:14:00	55.507	164.532
124	1	ar10	None	20Bon	4/28/95	18:14:00	55.507	164.532
125	1	ao10	ctd041	CTDB	4/28/95	19:53:00	55.627	164.15
125	2	ao10	None	60Bon	4/28/95	20:31:00	55.62517	164.1455
125	2	ao10	None	20Bon	4/28/95	20:31:00	55.62517	164.1455
125	2	ao10	None	CAT	4/28/95	20:31:00	55.62517	164.1455
126	1	ao13	None	60Bon	4/28/95	21:54:00	55.84483	164.3623
126	1	ao13	none	CAT	4/28/95	21:54:00	55.84483	164.3623
127	1	ao16	None	60Bon	4/28/95	23:29:00	56.065	164.5737
127	1	ao16	None	CAT	4/28/95	23:29:00	56.065	164.5737
128	1	ao19	None	60Bon	4/29/95	1:16:00	56.2845	164.7887
128	1	ao19	None	CAT	4/29/95	1:16:00	56.2845	164.7887
129	1	ao22	None	60Bon	4/29/95	3:01:00	56.50483	165.0035
129	1	ao22	None	CAT	4/29/95	3:01:00	56.50483	165.0035
130	1	ao25	None	60Bon	4/29/95	4:55:00	56.72733	165.217
130	1	ao25	None	CAT	4/29/95	4:55:00	56.72733	165.217
131	1	al25	None	60Bon	4/29/95	6:27:00	56.8435	164.833
131	1	al25	None	CAT	4/29/95	6:27:00	56.8435	164.833

132	1	ai25	None	CAT	4/29/95	7:55:00	56.96133	164.4497
132	1	ai25	None	60Bon	4/29/95	7:55:00	56.96133	164.4497
133	1	ai22	None	CAT	4/29/95	9:32:00	56.74533	164.2308
133	1	ai22	None	60Bon	4/29/95	9:32:00	56.74533	164.2308
134	1	ai19	None	CAT	4/29/95	11:14:00	56.52383	164.0207
134	1	ai19	None	60Bon	4/29/95	11:14:00	56.52383	164.0207
135	1	ai16	None	CAT	4/29/95	12:59:00	56.305	163.7998
135	1	ai16	None	60Bon	4/29/95	12:59:00	56.305	163.7998
136	1	al16	None	CAT	4/29/95	14:41:00	56.185	164.1878
136	1	al16	None	60Bon	4/29/95	14:41:00	56.185	164.1878
137	1	al19	none	CAT	4/29/95	16:16:00	56.40617	164.4053
137	1	al19	none	60Bon	4/29/95	16:16:00	56.40617	164.4053
138	1	ai22	None	CAT	4/29/95	18:14:00	56.62867	164.6138
138	1	ai22	None	60Bon	4/29/95	18:14:00	56.62867	164.6138
138	2	al22	ctd042	CTDB	4/29/95	19:00:00	56.61767	164.6227
139	1	None	ctd043	CTDB	4/29/95	22:36:00	56.45667	164.603
139	2	None	ctd044	CTDB	4/29/95	23:15:00	56.45617	164.6113
139	3	None	ctd045	CTDB	4/29/95	23:40:00	56.45583	164.6198
139	4	None	None	CAT	4/30/95	0:09:00	56.45467	164.6267
139	4	None	None	20Bon	4/30/95	0:09:00	56.45467	164.6267
139	4	None	None	60Bon	4/30/95	0:09:00	56.45467	164.6267
139	5	None	None	Moor	4/30/95	0:52:00	56.45617	164.6335
139	6	None	moc002	MOC1	4/30/95	4:45:00	56.45883	164.595
140	1	None	None	Trans	4/30/95	10:19:00	55.44883	164.8368
140	2	None	None	Trans	4/30/95	12:25:00	55.4225	164.8212
141	1	None	None	60Bon	4/30/95	15:15:00	54.87883	164.8615
142	1	None	None	60Bon	4/30/95	16:22:00	54.92967	164.9357
143	1	None	None	60Bon	4/30/95	17:04:00	54.9155	164.795
144	1	None	None	60Bon	4/30/95	17:42:00	54.84517	164.7965
145	1	None	None	60Bon	4/30/95	18:27:00	54.8455	164.917
146	1	None	None	60Bon	4/30/95	19:29:00	54.95083	164.9835
147	1	None	None	ShipBuoy	4/30/95	20:18:00	54.90283	164.8995
147	2	None	moc003	MOC1	4/30/95	20:37:00	54.90817	164.8872
147	3	None	ctd046	CTDB	4/30/95	21:28:00	54.91017	164.8827
147	4	None	ctd047	CTDB	4/30/95	22:03:00	54.915	164.8718
148	1	None	moc004	MOC1	4/30/95	22:44:00	54.88017	164.9517
148	2	None	ctd048	CTDB	4/30/95	23:33:00	54.88183	164.951
148	3	none	ctd049	CTDB	5/1/95	0:13:00	54.88417	164.94
149	1	None	moc005	MOC1	5/1/95	1:07:00	54.88167	164.9575
149	2	None	ctd050	CTDB	5/1/95	2:21:00	54.88433	164.9557
149	3	None	ctd051	CTDB	5/1/95	3:05:00	54.89217	164.9355
150	1	None	None	Live	5/1/95	3:15:00	54.89567	164.9368
150	2	None	None	Live	5/1/95	3:54:00	54.9135	164.9175
150	3	None	None	Live	5/1/95	4:22:00	54.92033	164.9095
150	4	none	None	CalVet	5/1/95	4:40:00	54.9225	164.9088
150	5	None	ctd052	CTD	5/1/95	4:53:00	54.924	164.909
150	6	None	None	Tuck1	5/1/95	5:24:00	54.92783	164.903
150	6	None	None	LG-CB	5/1/95	5:24:00	54.92783	164.903
150	7	None	None	Tuck1	5/1/95	5:53:00	54.93033	164.8927
150	7	None	None	LG-CB	5/1/95	5:53:00	54.93033	164.8927
150	8	None	None	Tuck1	5/1/95	6:26:00	54.93017	164.888

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150	8	None	None	LG-CB	5/1/95	6:26:00	54.93017	164.888
150	9	none	None	ShipBuoy	5/1/95	6:32:00	54.93233	164.8763
150	10	None	None	LG-CB	5/1/95	7:21:00	54.936	164.8808
150	10	None	None	Tuck1	5/1/95	7:21:00	54.936	164.8808
150	11	None	None	LG-CB	5/1/95	7:47:00	54.93	164.8768
150	11	None	None	Tuck1	5/1/95	7:47:00	54.93	164.8768
150	12	None	None	CalVet	5/1/95	8:10:00	54.93117	164.8808
150	13	None	None	Ring.8	5/1/95	8:20:00	54.92983	164.8818
□								