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CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE
LOWESTOFT LABORATORY, SUFFOLK, NR33 0HT

1999 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 4.

STAFF:

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DURATION: Left Lowestoft 15:30h, 9.July
Arrived Lowestoft 06:30h, 26 July
(All times are GMT)

LOCALITY: North Sea

AIMS:

1. To conduct a plankton survey using a 53cm high speed tow net fitted with a Guildline CTD monitoring system. To determine the distribution and abundance of crab (*Cancer pagurus*) larvae in relation to fishing grounds and sea bed sediments in the area 52° 30'N to 55° 15'N and 01° 30'W to 03° 00'E.
2. To deploy two Argos satellite tracked buoys in the area of expected high densities of crab larvae.
3. To continuously monitor temperature and salinity of sub-surface seawater and ambient light levels at the surface.
4. To carry out a side-scan sonar survey in the area of high concentration of crab larvae or on grounds suspected of supporting high densities of berried female crabs.

NARRATIVE:

RV Cirolana sailed from Lowestoft at 15:30h 9 July and steamed towards the first plankton station 5nml east of Gt. Yarmouth (52°37.5'N, 01° 52.5'E) (Figure 1). Three trial deployments of the plankton sampler were carried out *en route*, to familiarise scientific staff with station procedure, and to test the electronics and logging packages. On completion of the trials, sampling commenced at 19:00h, working east on a line of stations at latitude 52°37.5'N. Sampling continued in good weather, working north on east/west transects to the Norfolk Banks and into the Wash. Two Argos buoys were released in this area, one on 10 July south of the Docking Shoal at 53°12'N, 01° 00'E and the second, east of the Outer Dowsing at 53°30'N, 01° 08'E the following day. On 12 July, with good progress being maintained and the need for fuel economy,

it was decided to continue the survey on one engine with a review of progress each day. Sampling continued with few problems until 11:30h 15 July when course was set for Whitby to collect a side-scan sonar which had been delivered to the SFI office at Scarborough the previous day. The side-scan sonar was collected from Whitby using the ship's searider and plankton sampling recommenced off the Tees (54°37.5'N, 00° 51.5'W) at 18:30h. The plankton survey continued in fair weather until 07:30h 19 July when the final station on the main grid was completed at 55°07.5'N, 02° 52.5'E.

Cirolana then steamed south, south-west to begin sampling on a finer scale plankton grid over the area of expected high concentrations of crab larvae south of Flamborough (Figure 2). Sampling recommenced at 18:00h 19 July, at the north-east corner of the fine scale grid (54°00'N, 02° 00'E). Progress was slowed by increasing west and later north-west winds, force 6-7, on the 21 and 22 July which necessitated the use of two engines to maintain course and speed. The winds eased the following day and sampling continued with the use of one engine. The fine scale survey was completed at 19:30h 23 July at the south-east corner of the grid (53°00'N, 02° 00'E) and preparations were made to use the side-scan sonar the next day.

The side-scan sonar was deployed in the area of the Norfolk offshore crab fishery on 24 July. The side-scan was towed along 14 transect lines, running north-west/south-east, in a box east of the Race Bank (Figure 2). Each transect line was approximately 4nml long, and data on the bottom topography of the area was logged continuously to a PC.

A second side-scan survey was carried out the following day in the Outer Dowsing Channel. This contrasting area is not subject to crab fishing but is known (from earlier surveys) to contain higher densities of larvae. The side-scan was towed east/west along 12 transect lines, each 4.8nml long. The survey was completed by 19:00h 25 July when Cirolana began the passage back to Lowestoft.

RV Cirolana Docked in Lowestoft 06:30h 26 July.

RESULTS:

Aim 1.

A total of 141 plankton stations was completed on the main sampling grid between latitudes 52°30'N and 55° 15'N (Figure 1). The finer scale plankton grid consisted of 58 stations between Flamborough and the north Norfolk coast (Figure 2). The samples were generally small with only the occasional jellyfish causing problems with both sample handling and flowmeter performance.

The sampler was fitted with a Guildline CTD, Aquatracka fluorometer and a light cell. These sensors provided temperature, salinity, chlorophyll 'a' fluorescence and light profiles on each plankton station. Stratification of the water column was evident in the deep water (>70m) at the more northerly stations on the main grid (Figure 3). Surface to bottom temperature profiles in this area showed differences >9°C, whereas cooler, coastal water and shallow water on the Dogger Bank remained well mixed.

It is pleasing to report that in nearly 200 deployments, no problems were encountered with either the 'new' 8715 Guildline CTD or the towing cable. This is the third plankton cruise using these 8715 CTD's and they have caused no problems in over 500 deployments.

Aim 2.
Two Argos satellite tracked buoys were deployed in the area of the Norfolk crab fishery on 10 and 11 July. These should provide valuable information on the drift of larvae in this area prior to settlement.

Aim 3.
The Chelsea instruments CTD continuously monitored temperature and salinity from the ship's surface seawater supply throughout the plankton surveys. Discrete samples of surface seawater were taken at each plankton sampling station to provide a salinity calibration for both the Guildline and Chelsea CTD's. A sample of surface seawater was also filtered at each station and the filter papers frozen. These samples will enable chlorophyll 'a' fluorescence to be measured in the laboratory and will provide a calibration for the Aquatracka fluorometer. Surface light levels were measured using a deck mounted light cell. Data from the Chelsea CTD and the deck light cell were continuously logged onto a PC.

Aim 4.
Side-scan sonar surveys were completed east of the Race Bank and in the Outer Dowsing Channel (Figure 2). Large numbers of crab pot dahns restricted the length of some transect lines in the Race Bank area. The majority of the pots were at the southern end of the side-scan box and this coincided with rougher ground as identified by the side-scan software.

The Outer Dowsing area had no crab fishing activity and was virtually featureless.

S. Milligan
26 July 1999

SEEN IN DRAFT
Master: R. Williams
Senior Fishing Mate: R. Graham

INITIALLED
FSMG Board Chair: Dr G Arnold

DISTRIBUTION
Basic list
Staff on cruise
SFI Scarborough

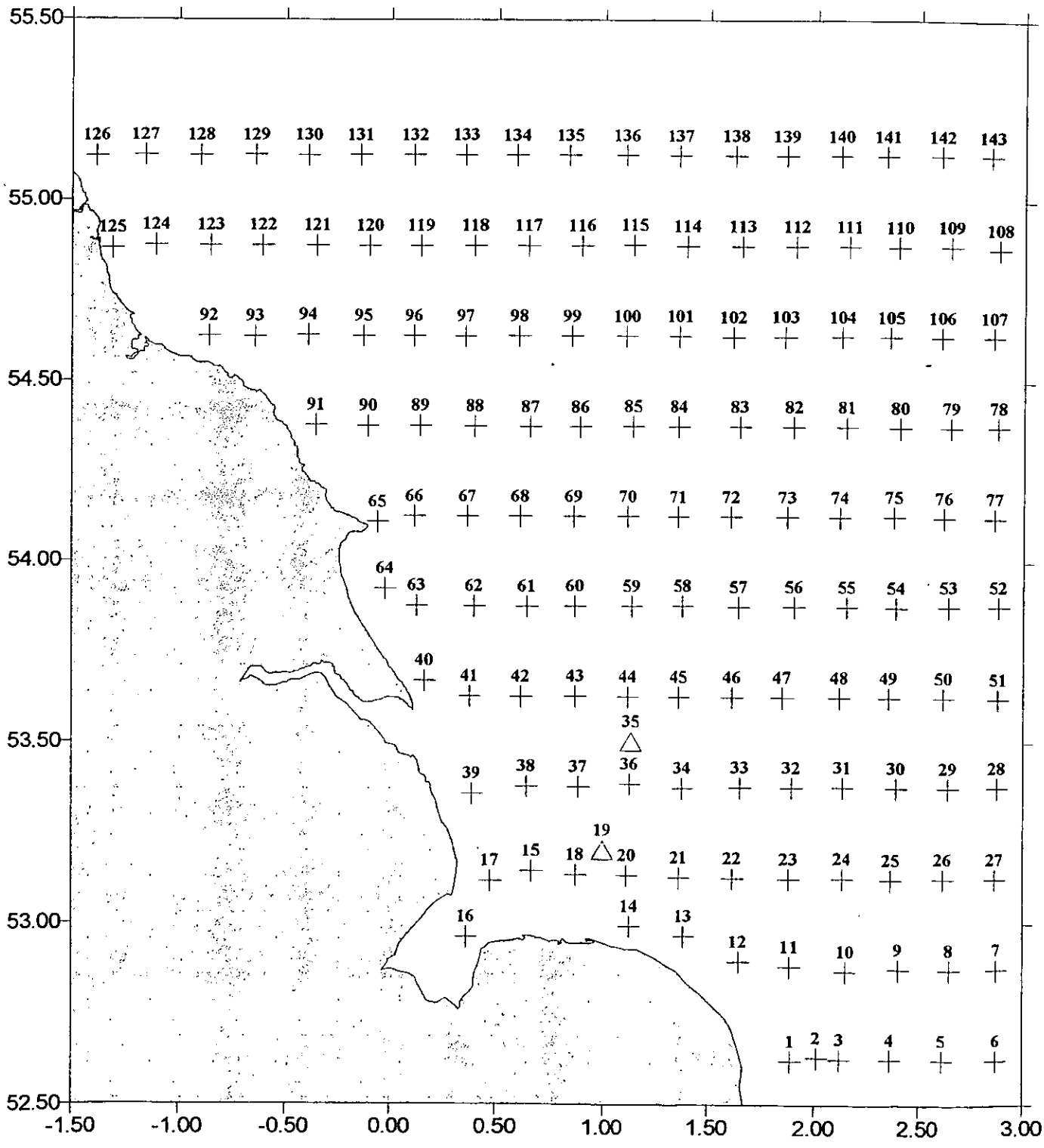

Figure 1 - Main grid plankton stations (+) and argos buoy positions (△) (9 - 19th July).

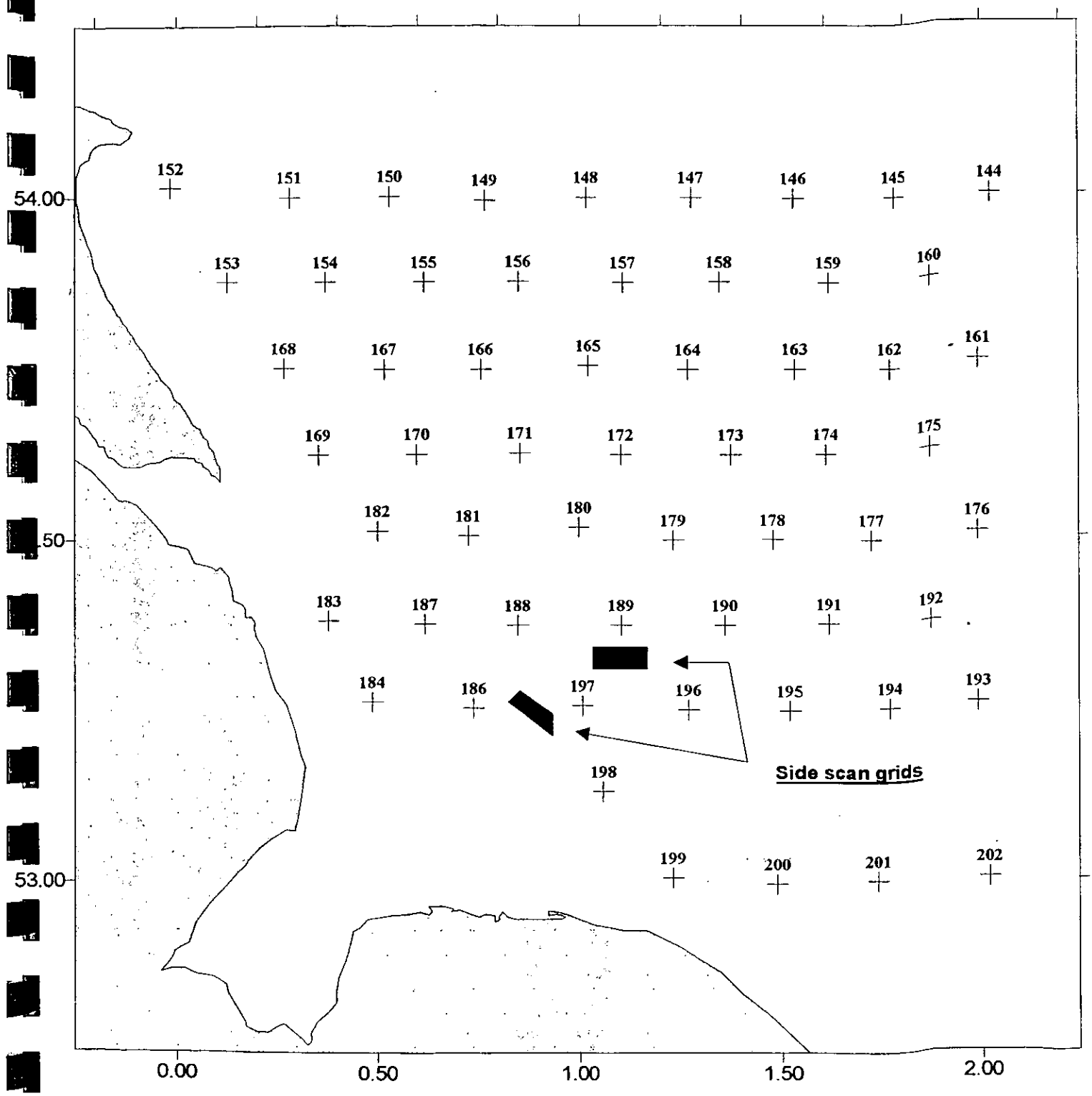

Figure 2 - Mini grid plankton stations and side scan grids - (19 - 25th July).

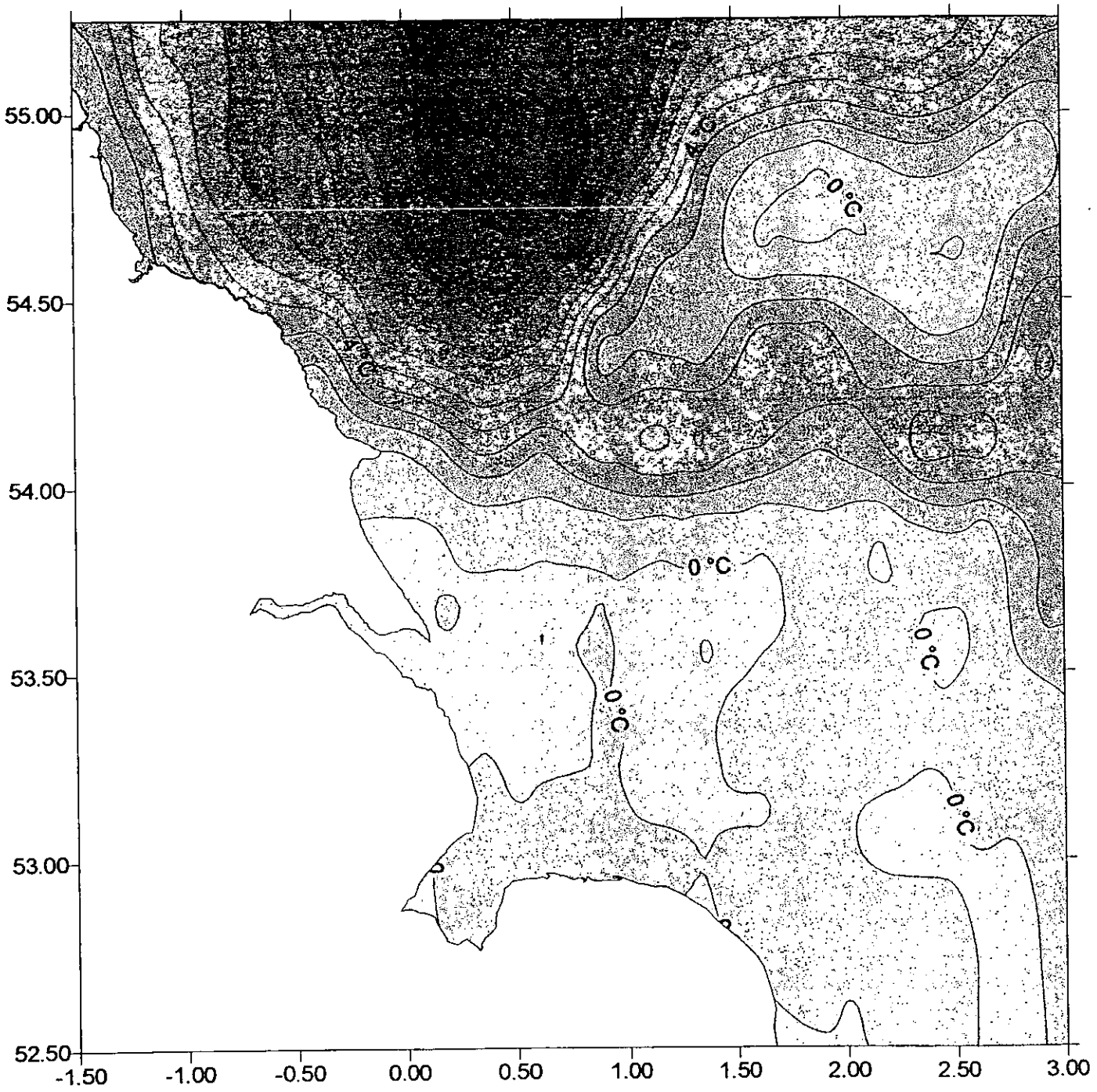

Figure 3 - Difference between surface and bottom temperatures (°C).