**INTERNATIONAL COUNCIL FOR
THE EXPLORATION OF THE SEA**

C.M. 1981/H : 17
Pelagic Fish Cttee

REPORT ON THE INTERNATIONAL YOUNG FISH SURVEY 1981: HERRING DATA

by

A. Corten and C.J. Kuiter
Netherlands Institute for Fishery Investigations
PO Box 68, 1970 AB IJmuiden
The Netherlands.

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Introduction.

This paper is one in a series of annual reports on the International Young Fish Surveys. These surveys are conducted each year during the month of February in the North Sea, Skagerrak and Kattegat. Their objective is to obtain recruitment estimates for herring and a number of roundfish species. An evaluation of the survey results up till present is given in the latest report of the two ICES Working Groups that are dealing with these surveys (Anon. 1981 a). This report only presents the results from the 1981 survey as far as herring is concerned; data on roundfish species are presented to the 1981 Council Meeting in document G : 71.

Methods and Participation.

All vessels participating in the 1981 survey were equipped with the standard GOV bottom trawl for sampling both herring and gadoids of 1 year and older. In addition, most ships carried an Isaacs-Kidd Midwater Trawl (IKMT) for sampling 0-group herring at night. Details on the survey methods are given in the "Manual for the International Young Fish Surveys in the North Sea, Skagerrak and Kattegat" (Anon. 1981 b).

Participants in the 1981 survey were:

Country	Vessel:	Period:	Project supervisor:
Fed. Rep. of Germany	A. Dohrn	21/1 - 7/2	G. Wagner
The Netherlands	Tridens	2/2 - 5/3	A. Corten
Norway	M. Sars	28/1 - 20/2	J. Lahn-Johannessen
Sweden	Argos	3/2 - 19/2	O. Hagström
U.K. (England)	Cirolana	28/1 - 14/2	W. Parnell
U.K. (Scotland)	Explorer	12/2 - 25/2	A. Saville
U.S.S.R.	Korifena	26/1 - 10/2	Yu. Vialov

Unfortunately, France had to cancel its participation in the 1981 survey because of a fire on board RV "Thalassa". Also Denmark was unable to participate in the survey because its new research vessel "Dana" was not yet available.

Results.

0-group herring (year class 1980 autumn spawners):

Five vessels (Cirolana, Tridens, M. Sars, Explorer and Argos) fished for herring larvae with the IKMT. They made a total of 289 hauls in 109 statistical rectangles. The coverage of the North Sea, Kattegat and Skagerrak was fairly good, except for the northwestern North Sea where fishing was hampered by bad weather.

The highest densities of herring larvae were found in the southeastern North Sea and in the Skagerrak and Kattegat (figure 1). For the southeastern North Sea, this was the second year in succession with high numbers of larvae, while for the Skagerrak and Kattegat the numbers found in 1981 were very much higher than in any of the previous years:

Year class	Number of squares fished	Mean No/square total North Sea	Mean No/square eastern N. Sea ')	Mean No/square Div. III a.
1976	77	5.8	0.0	0.2
1977	122	3.9	1.5	0.9
1978	101	10.5	0.9	7.9
1979	133	28.9	63.3	9.5
1980	109	21.8	32.6	35.9

') east of 5° E.

Larvae sampled in the southeastern North Sea were of a relatively large size. This was probably due to the fact that by February a large proportion of them were distributed already in coastal waters, where food supply is better than in the open sea. Considering the fact that the number of large herring larvae in the coastal zone was higher than in any of the previous years, the prospects for year class 1980 seem to be rather promising.

A detailed comparison between the results of the IKMT-sampling in 1981 and previous years is given by Corten (1981).

1-Ringed herring. (mainly year class 1979 autumn spawners).

Sampling of 1-ringed herring was concentrated in the herring standard area, which covers 57 statistical rectangles in the central and southern North Sea (figure 2).

Mean numbers per haul are shown for each statistical rectangle in figure 3. As in previous years, no distinction has been made between autumn and spring spawners, because this classification is difficult to make in juvenile fish. It is assumed that the great majority of 1-ringed herring in North Sea and Skagerrak were autumn spawners of year class 1979. In the Kattegat, the majority of the 1-ringed herring were presumably spring spawners of the 1980 year class. Research by Swedisch workers has shown that I-group herring caught during the IYFS in February 1980 consisted for 60% of spring spawners of local origin and for 40% of autumn spawners probably derived from the North Sea (Anon. 1981 c).

The numbers of 1-ringed herring caught in the central and southern North Sea were at about the same level as in 1980. The mean density of 1-ringers for the herring standard area was 551/hour, which is 38% of an average year class from the period 1968-73 (Table I).

The distribution of the herring was also similar to the one in the previous year. The main concentrations were found in the German Bight, along the Dutch coast and in the Kattegat. As mentioned earlier, the Kattegat herring were probably partly spring spawners.

Compared with 1980, the herring in the German Bight were distributed slightly more to the west in 1981. This may be due to the greater length of the fish in 1981 (the 1-ringers in 1980 were exceptionally small). Mean lengths of 1-ringed herring are shown in figure 4.

The fact that year class 1979 now appears to be of the same strength as year class 1978 is remarkable in view of the great difference in abundance at the 0-group stage. Year class 1979 was much more abundant at this age than year class 1978 (Corten, 1980), and yet the abundance one year later is approximately the same. Apparently, a distribution of 0-group herring such as found in February 1980 is no guarantee for a good year class.

One possible explanation is that the distribution pattern of the larvae in February 1980 was not quite optimal yet. A comparison with the IKMT-results in February 1981 shows that in the latter year the larvae were distributed even further inshore, and they also had a greater length than the larvae in 1980.

Alternatively, all the conditions for a good year class 1979 may have existed in February 1980, but the year class may have been decimated in the following months by some unusual predator.

2-ringed herring (mainly year class 1978 autumn spawners).

Mean catches per rectangle of 2-ringed herring are shown in figure 5. Substantial numbers of this age group were only encountered along the Dutch coast and in the Kattegat. A large proportion of the fish in Kattegat consisted probably of local spring spawners of year class 1979. The 2-ringers along the Dutch coast had a rather low mean length, and a high percentage of very small or opaque otolith nucleii. Both characteristics suggest that these fish will recruit to the spawning stock of the Southern Bight and Eastern Channel.

References.

Anon., 1981 a	Report of the joint meeting of the International Young Herring Survey Working Group and the International Gadoid Survey Working Group. ICES C.M. 1981/H : 10.
Anon., 1981 b	Manual for the International Young Fish Surveys in the North Sea, Skagerrak and Kattegat. ICES C.M. 1981/H : 9.
Anon., 1981 c	Report of the Working Group on Division III a stocks. ICES C.M. 1981/G : 12.
Corten, A., 1981 and G.Van der Kamp	Observations on herring larvae caught by Isaacs-Kidd Midwater Trawl during the International Young Fish Survey in the North Sea, Skagerrak and Kattegat in 1977-1981. ICES C.M. 1981/H : 19.
Corten, A., 1980 and C.J. Kuiter	Report of the ICES Young Fish Survey 1980: Herring Data. ICES C.M. 1980/H : 35.

TABLE I - Mean abundance of 1-ringed herring for the herring standard area.

Survey year	Year class (assuming all fish are autumn spawners)	No/hour
1970	1968	822
1971	1969	2647
1972	1970	1629
1973	1971	827
1974	1972	1195
1975	1973	1529
1976	1974	452
1977	1975	342
1978	1976	575
1979	1977	139
1980	1978	535
1981	1979	551

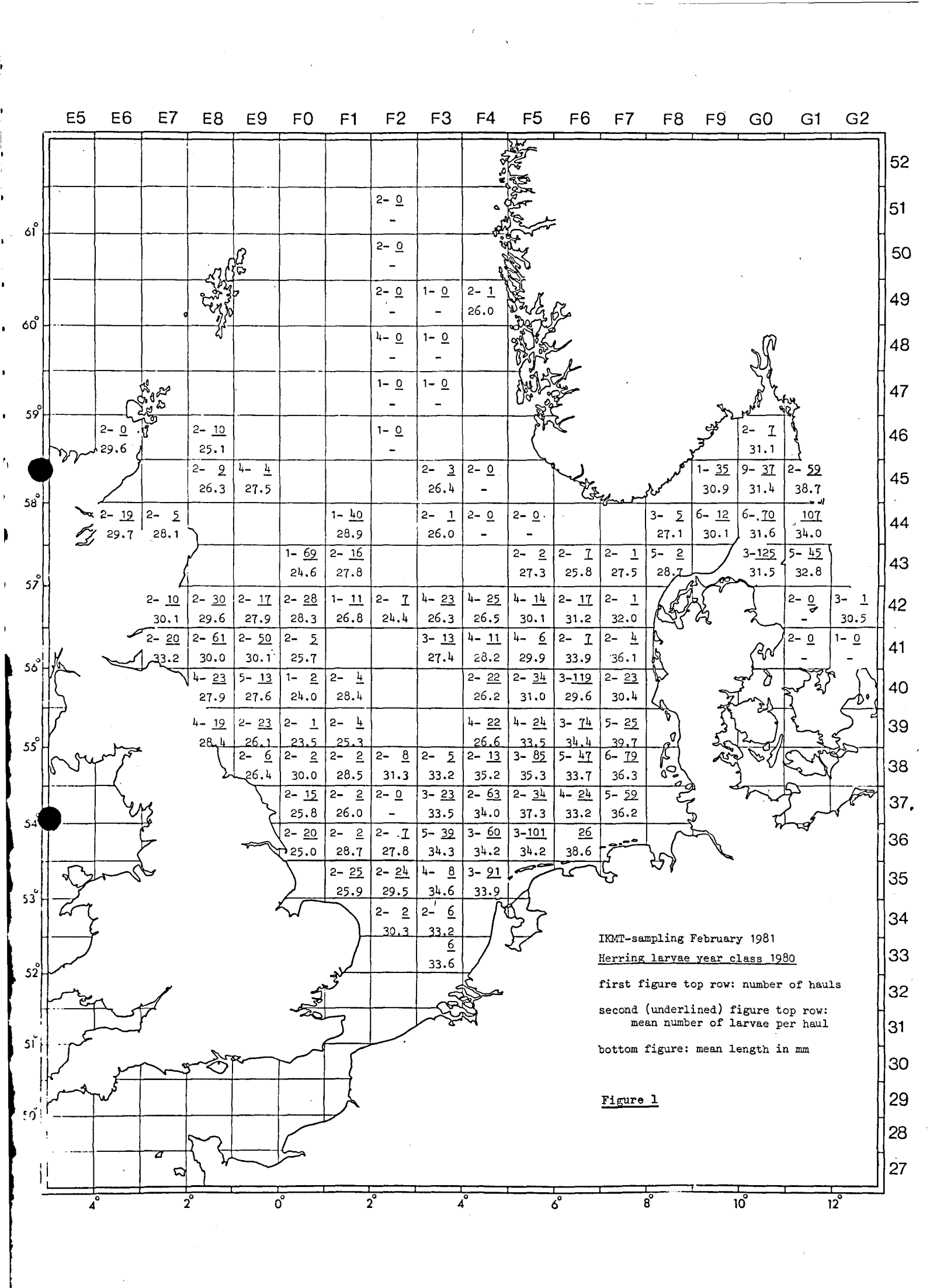

E5 E6 E7 E8 E9 F0 F1 F2 F3 F4 F5 F6 F7 F8 F9 G0 G1 G2
52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27
61° 60° 59° 58° 57° 56° 55° 54° 53° 52° 51° 50°
4° 2° 0° 2° 4° 6° 8° 10° 12°
2- 0 29.6
2- 10 25.1
2- 9 26.3
4- 4 27.5
2- 19 29.7
2- 5 28.1
1- 40 28.9
2- 1 26.0
2- 0 -
2- 0 -
3- 5 27.1
6- 12 30.1
6- 70 31.6
107 34.0
1- 69 24.6
2- 16 27.8
2- 2 27.3
2- 7 25.8
2- 1 27.5
5- 2 28.7
3-125 31.5
5- 45 32.8
2- 10 30.1
2- 30 29.6
2- 17 27.9
2- 28 28.3
1- 11 26.8
2- 7 24.4
4- 23 26.3
4- 25 26.5
4- 14 30.1
2- 17 31.2
2- 1 32.0
2- 0 -
3- 1 30.5
2- 20 33.2
2- 61 30.0
2- 50 30.1
2- 5 25.7
3- 13 27.4
4- 11 28.2
4- 6 29.9
2- 7 33.9
2- 4 36.1
2- 0 -
1- 0 -
4- 23 27.9
5- 13 27.6
1- 2 24.0
2- 4 28.4
2- 22 26.2
2- 34 31.0
3-119 29.6
2- 23 30.4
4- 19 28.4
2- 23 26.1
2- 1 23.5
2- 4 25.3
4- 22 26.6
4- 24 33.5
3- 74 34.4
5- 25 39.7
2- 6 26.4
2- 2 30.0
2- 2 28.5
2- 8 31.3
2- 5 33.2
2- 13 35.2
3- 85 35.3
5- 47 33.7
6- 79 36.3
2- 15 25.8
2- 2 26.0
2- 0 -
3- 23 33.5
2- 63 34.0
2- 34 37.3
4- 24 33.2
5- 59 36.2
2- 20 25.0
2- 2 28.7
2- 7 27.8
5- 39 34.3
3- 60 34.2
3-101 34.2
26 38.6
2- 25 25.9
2- 24 29.5
4- 8 34.6
3- 91 33.9
2- 2 30.3
2- 6 33.2
6 33.6
IKMT-sampling February 1981
Herring larvae year class 1980
first figure top row: number of hauls
second (underlined) figure top row: mean number of larvae per haul
bottom figure: mean length in mm

Figure 1

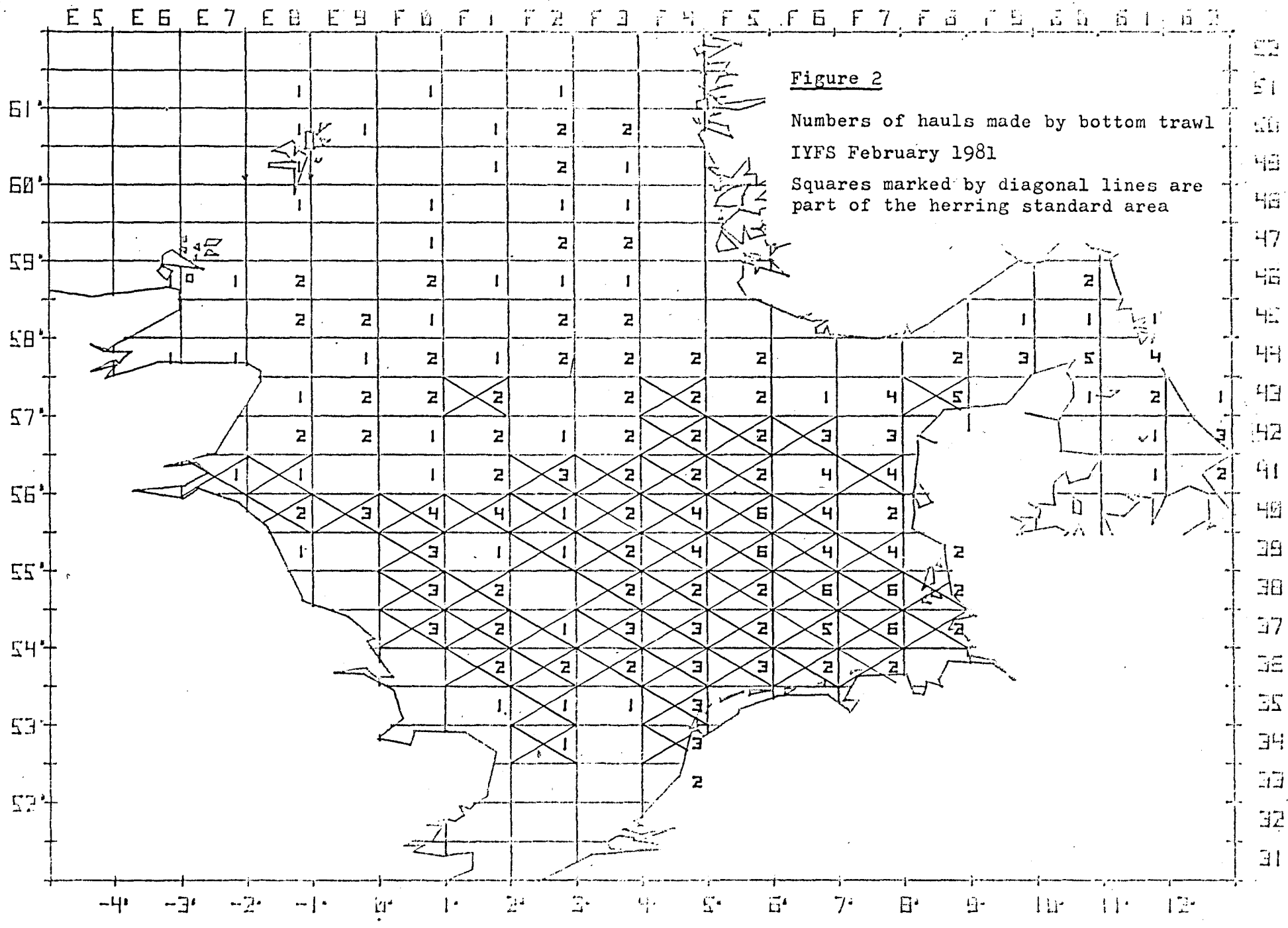
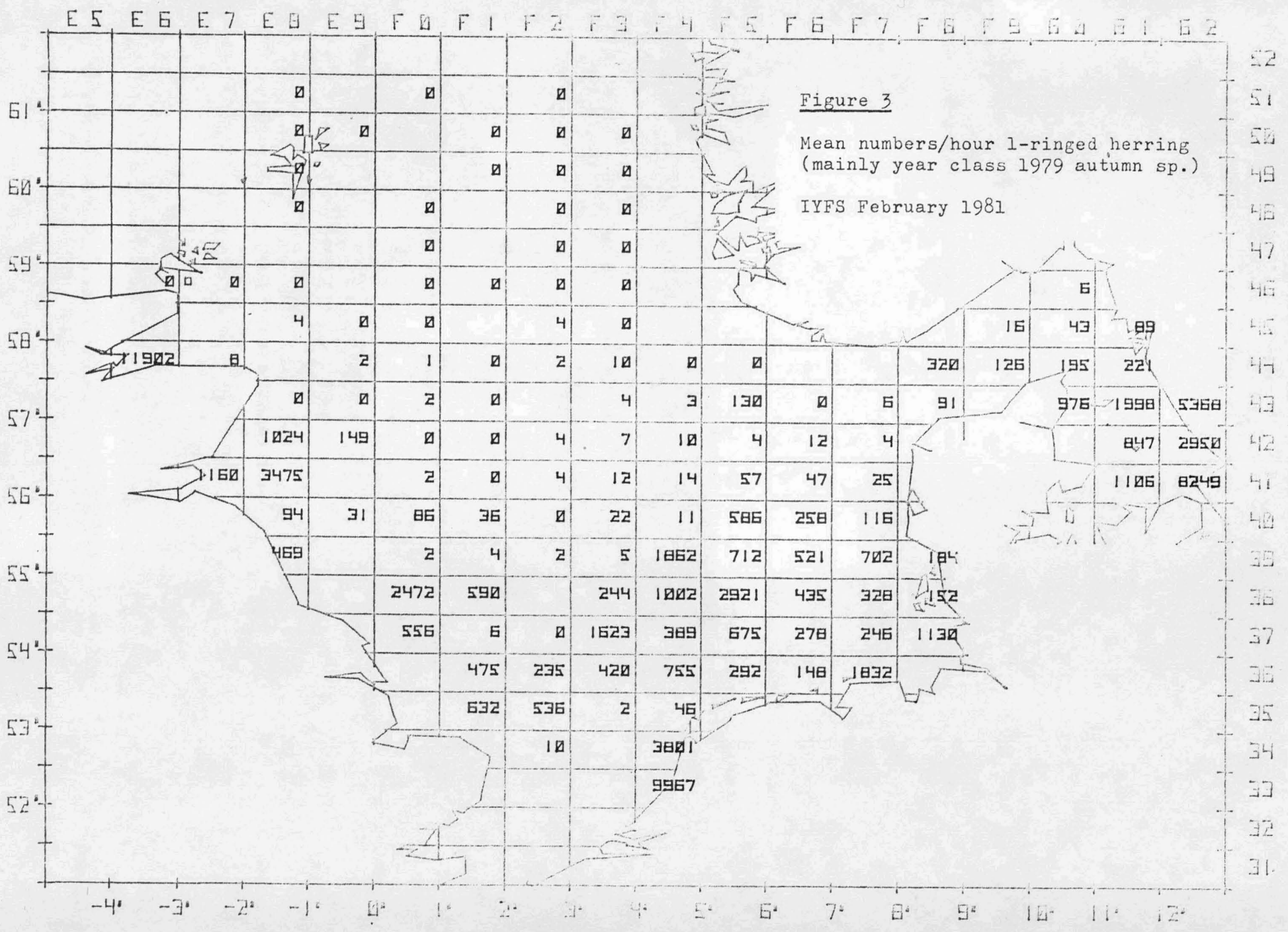


Figure 2

Numbers of hauls made by bottom trawl

IYFS February 1981

Squares marked by diagonal lines are part of the herring standard area


E5 E6 E7 E8 E9 F0 F1 F2 F3 F4 F5 F6 F7 F8 F9 G0 G1 G2
61° 60° 59° 58° 57° 56° 55° 54° 53° 52°
52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31
-4° -3° -2° -1° 0° 1° 2° 3° 4° 5° 6° 7° 8° 9° 10° 11° 12°
Figure 3
Mean numbers/hour 1-ringed herring
(mainly year class 1979 autumn sp.)
IYFS February 1981

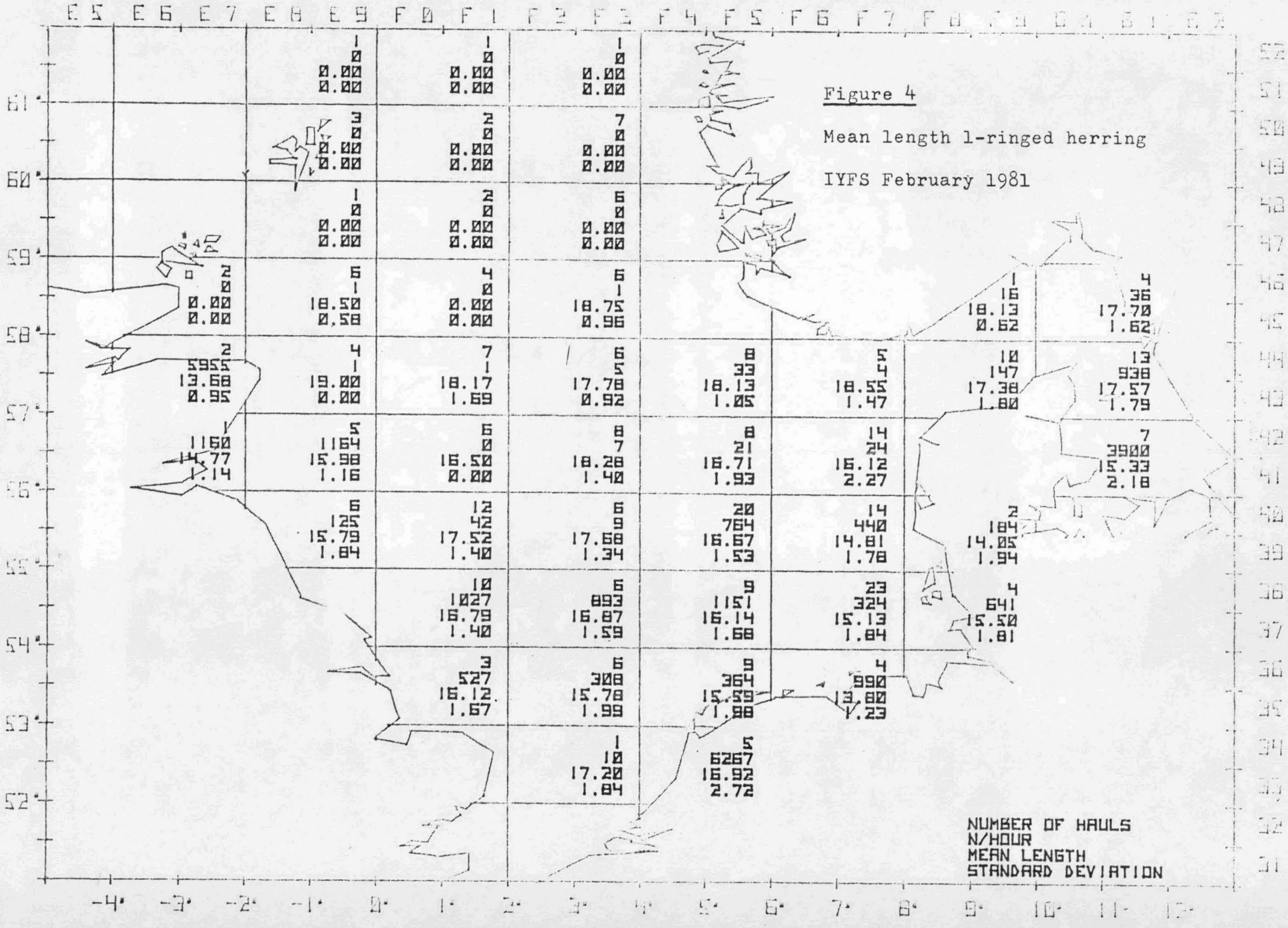


Figure 4

Mean length 1-ringed herring

IYFS February 1981

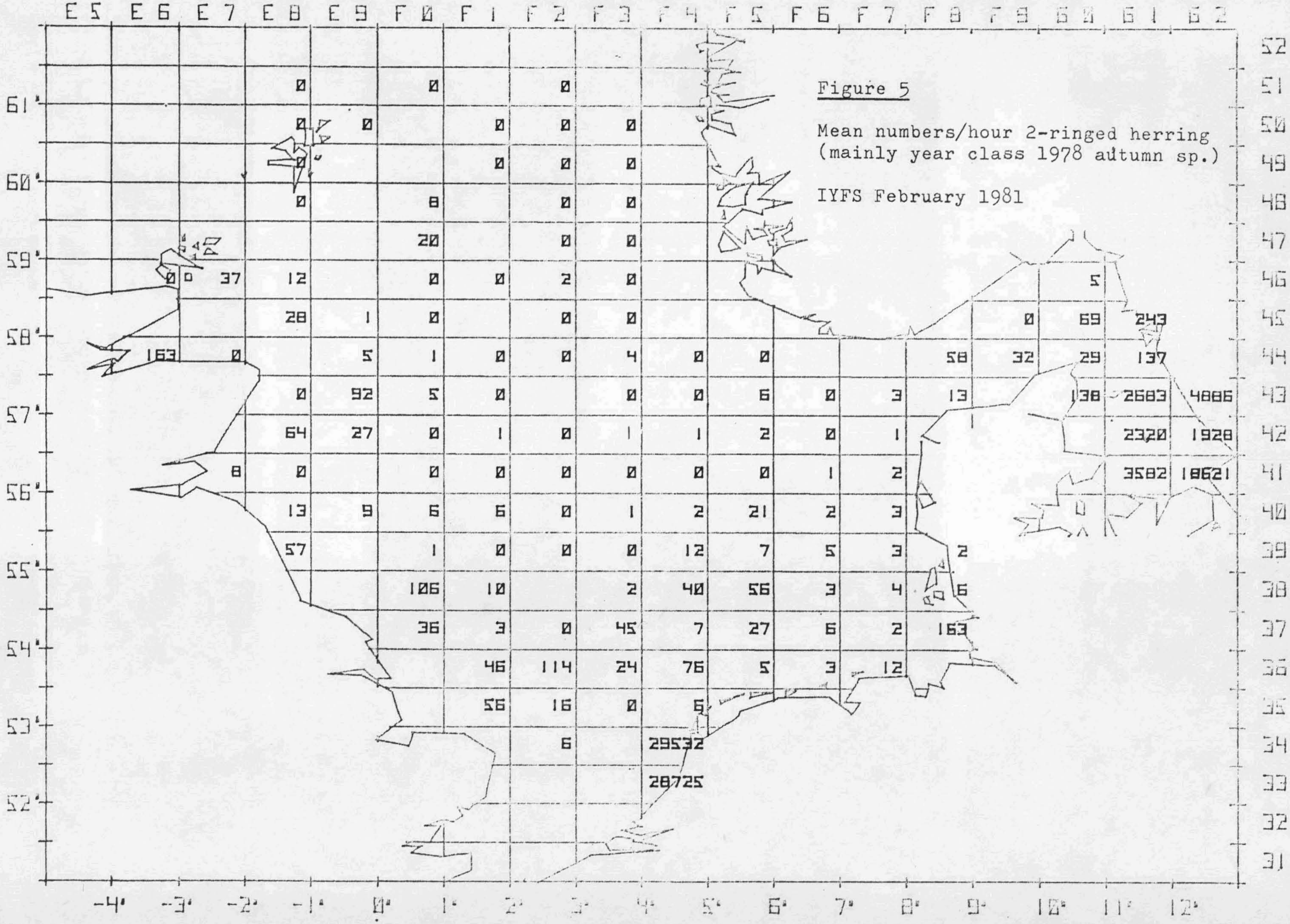


Figure 5

Mean numbers/hour 2-ringed herring (mainly year class 1978 autumn sp.)

IYFS February 1981

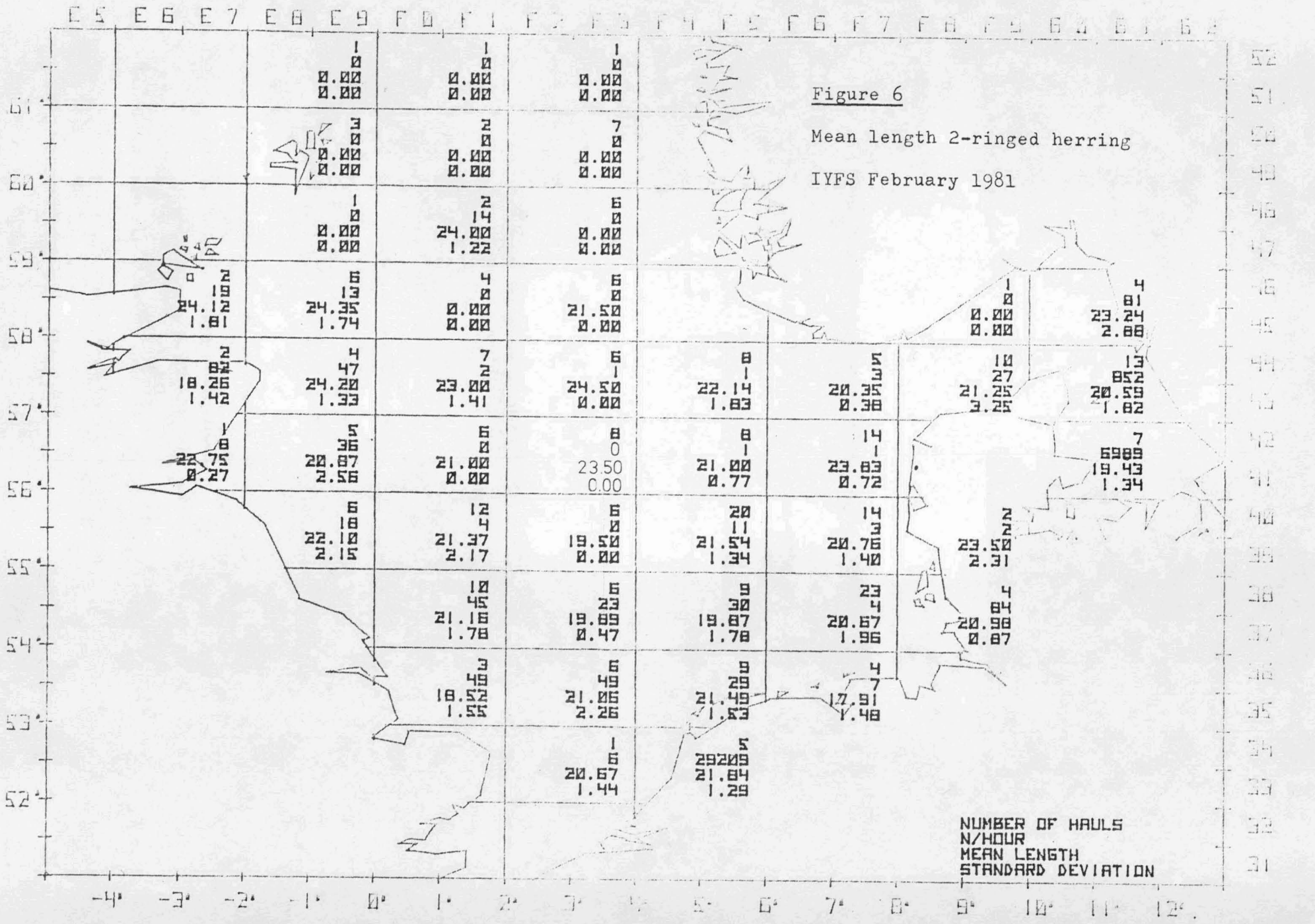


Figure 6
Mean length 2-ringed herring
IYFS February 1981
NUMBER OF HAULS
N/HOUR
MEAN LENGTH
STANDARD DEVIATION