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REPORT ON THE INTERNATIONAL TRAWLING SURVEY FOR IMMATURE HERRING IN THE NORTH SEA 1973.

by

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This paper not to be cited without prior reference to the authors.

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Introduction.

The programme of international young herring surveys in the North Sea is intended to provide estimates on the strength of new year-classes before they enter the adult herring fisheries. Apart from being of direct interest to the fishing industry, this information will also be vital for a future management of the fishery by means of a catch quota system.

In February 1973, the 10th survey in this series was made. Previous ones were made in 1960 and 1961, and then on a yearly basis starting from 1966. Results of these surveys were reported by the North Sea Young Herring Working Group (Burd 1969, Anon 1971), Zijlstra (1966), Saville (1967), Postuma (1968), Postuma and Zijlstra (1969), Schubert (1970), Postuma and Kuiter (1971, 1972).

Methods

Procedures for the 1973 survey were similar to the ones used in previous years. Each of the participating vessels was allocated a number of statistical squares, and at least one haul was made at a random position within each square. The gear used was a herring bottom trawl with a small-mesh codend. Catches of herring were sampled for age-composition and racial characters.

The abundance of year-class 1970 and 1971 was expressed in numbers per one-hour tow. No corrections were made for differences in fishing power between the vessels. Mean length, VS and K_2 were calculated for the whole area by raising values for each square with the corresponding density of fish.

Coordination of the survey and compilation of final results was done in IJmuiden.

The following ships participated in the 1973 survey :

Country	Ship	Period	Hauls	Herring sampled
Denmark	Dana	9 - 23 Febr.	19	1625
England	Cirolana	9 - 24 Febr.	23	600
Germany	Anton Dohrn	9 - 20 Febr.	46	840
Netherlands	Tridens	29 Jan. - 16 Febr.	38	625
Scotland	Explorer	17 Jan. - 9 Febr.	51	890
Sweden	Skagerrak	31 Jan. - 16 Febr.	16	1020
U.S.S.R.	Aliot	7 - 25 Febr.	30	100

Results

The survey area extended between 52°00 N and 59°00 N, including Skagerrak and Kattegat. A total of 223 hauls was made by all vessels, covering 123 squares. Figures 1 - 8 represent numbers per one-hour tow, mean length, VS and K_2 of yearclass 1970 and 1971.

The mean density of year-class 1971 for all squares combined was 411. This is slightly below the long-term average of previous year-classes. Out of 10 year-classes measured as I-group fish since 1960, 7 were stronger and 3 were smaller than year-class 1971 (table 1).

Compared with the two previous year-classes (1969 and 1970), year-class 1971 appears to be much smaller.

The distribution of year-class 1971 was peculiar since it was limited mainly to the eastern part of the central North Sea. Very few I-group herring were found in the western and northern parts of the North Sea, except for some patches along the English and Scottish coasts.

Table 1 compares mean length, VS and K_2 of year-class 1971 with data for previous year-classes. Its mean length of 16.40 cm was about normal, but its mean VS of 56.29 was the lowest ever recorded since the start of the international young herring surveys.

Herring of year-class 1970 were found along the eastern side of the Dogger Bank, off Shields and in the Moray Firth. An exceptionally large haul of II-group herring was made by RV "Cirolana" off Shields in square 2708. This catch has not been used in calculating mean density, length, VS and K_2 for the whole survey area. Thus excluding square 2708, the mean density of year-class 1970 was found to be 57.

Discussion

One problem that needs further consideration is the presence in the North Sea of juvenile herring that originated elsewhere. Larval surveys north of Scotland in 1970 and 1971 have shown that substantial numbers of larvae born west of 4° W are transported by currents into the North Sea (Zijlstra 1972, Schnack 1973). If some of these larvae survive, then part of the juvenile herring in the North Sea will belong to stocks outside the area. In fact, there have been indications of the presence in the North Sea of juvenile herring that belonged to stocks west of Scotland (Anon 1969, Saville 1971).

This theory may also explain the discrepancy between the high abundance of year-class 1969 as measured during the International Young Herring Surveys, and the much lower abundance of the same year-class during the commercial fishing season in the North Sea in 1972. In view of the good catches of year-class 1969 west of 4° W, it seems reasonable to assume that part of juvenile fish from the North Sea recruited to stocks west of 4° W.

Our experience with year-class 1969 shows that caution is needed in interpreting results of the International Young Herring Surveys. The abundance of juveniles in the North Sea may be indicative of recruitment to stocks both in the North Sea and west of Scotland. Results of the 1973 survey thus indicate an overal recruitment slightly below average to stocks in the North Sea and west of 4° W.

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TABLE 1. Mean abundance, mean length and mean number of vertebrae of I Group Herring in the North Sea and the Skagerrak between 52° N.L. and 59° N.L.

Yearclass	Catch/hour	V.S.	L
1958	1230	56.42	16.05
1959	337	56.45	16.05
----	----	-----	-----
1963	2797	56.44	14.90
1964	714	56.49	16.73
1965	238	56.49	17.13
1966	265	56.48	16.83
1967	455	56.51	17.32
1968	442	56.47	15.67
1969	1241	56.49	15.31
1970	844	56.47	16.54
1971	411	56.29	16.40

TABLE 2. Catch in numbers per hour per statistical rectangle of I and II Group herring in the North Sea and Skagerrak.

Yearclass	I GROUP	II GROUP
1957	----	222
1958	1230	167
1959	337	----
----	----	----
1962	----	28
1963	2797	184
1964	714	56
1965	238	10
1966	265	45
1967	455	87
1968	442	73
1969	1241	354
1970	844	57
1971	411	

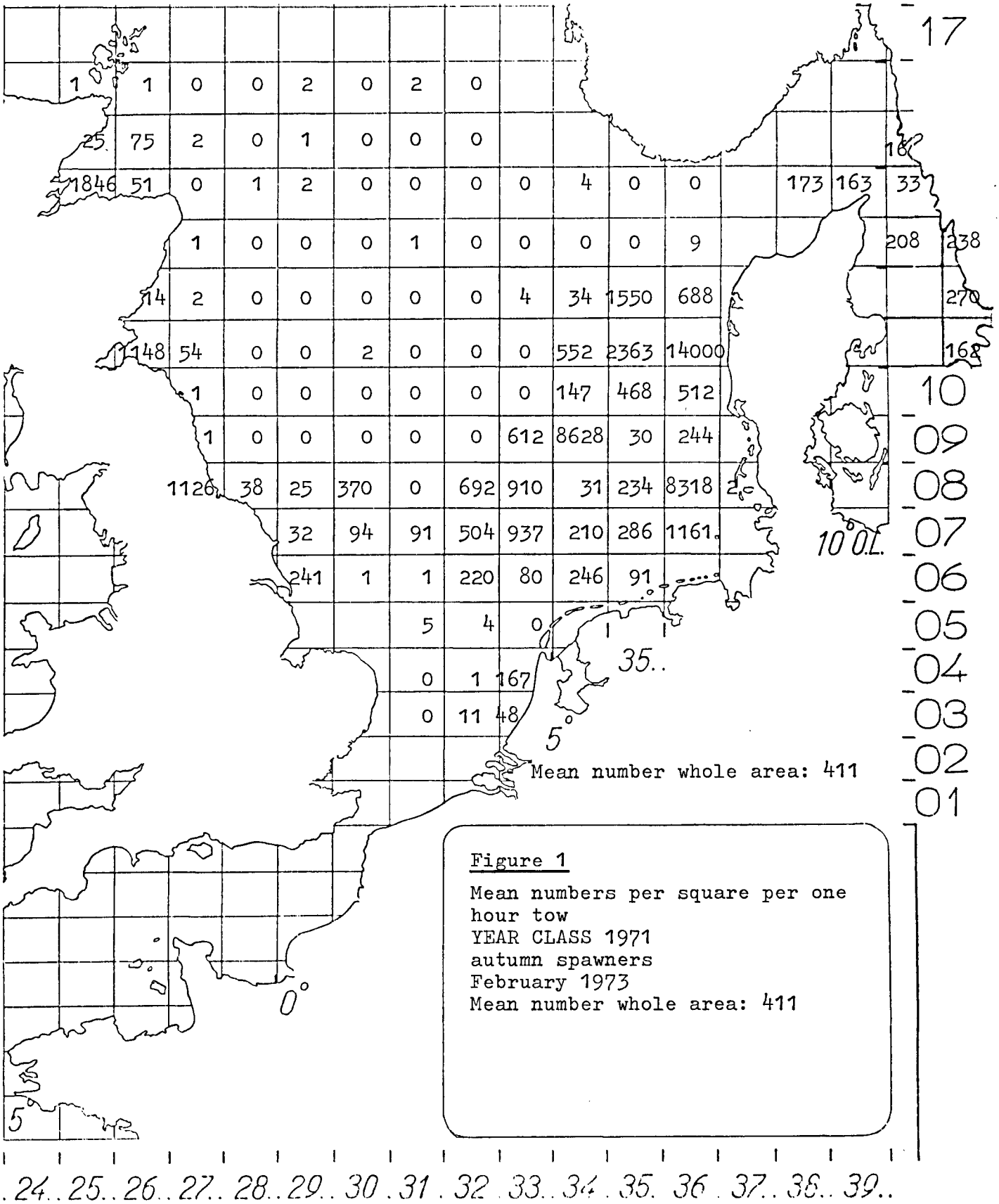

Figure 1

Mean numbers per square per one hour tow
YEAR CLASS 1971
autumn spawners
February 1973
Mean number whole area: 411

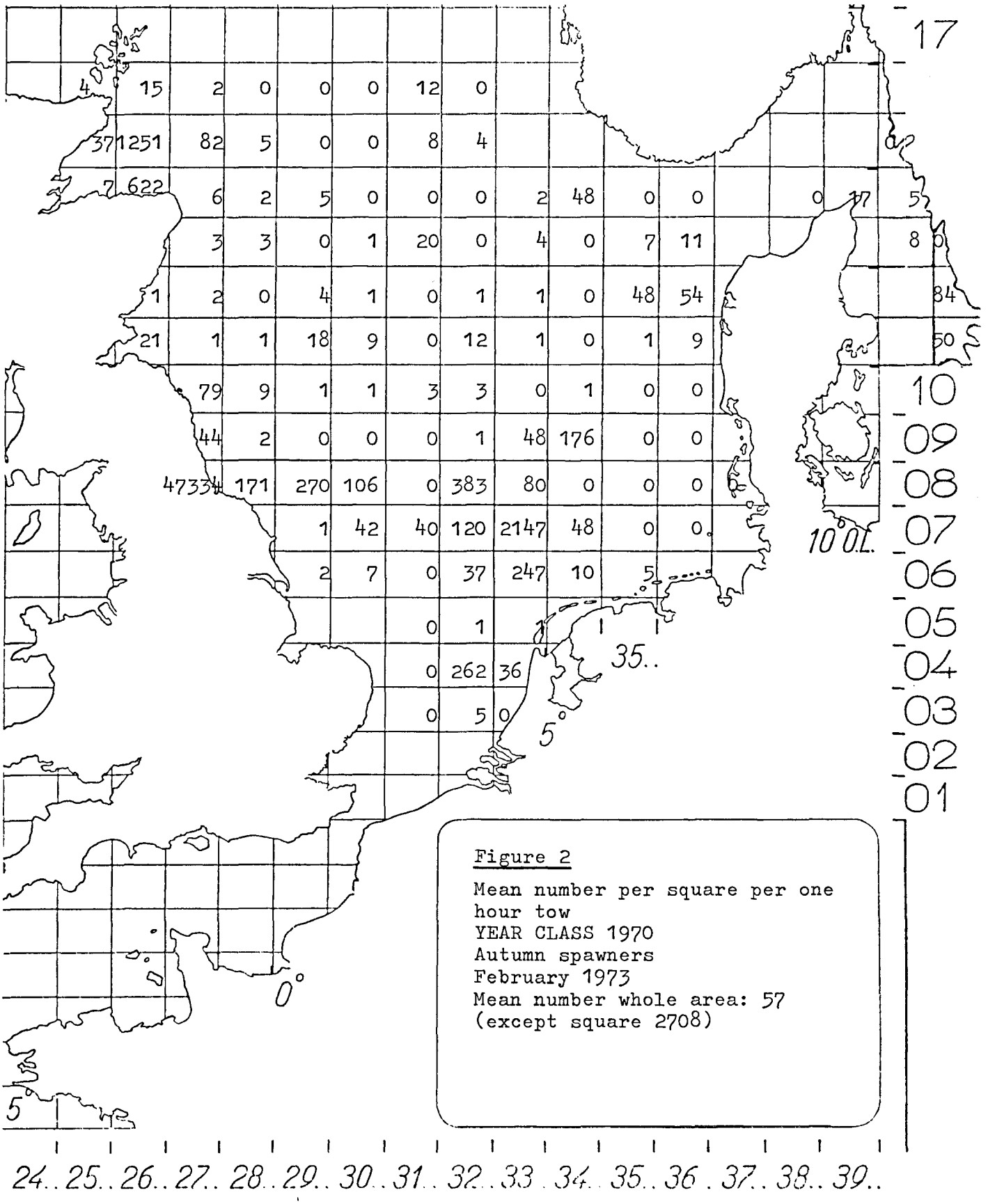

Figure 2

Mean number per square per one hour tow
YEAR CLASS 1970
Autumn spawners
February 1973
Mean number whole area: 57
(except square 2708)

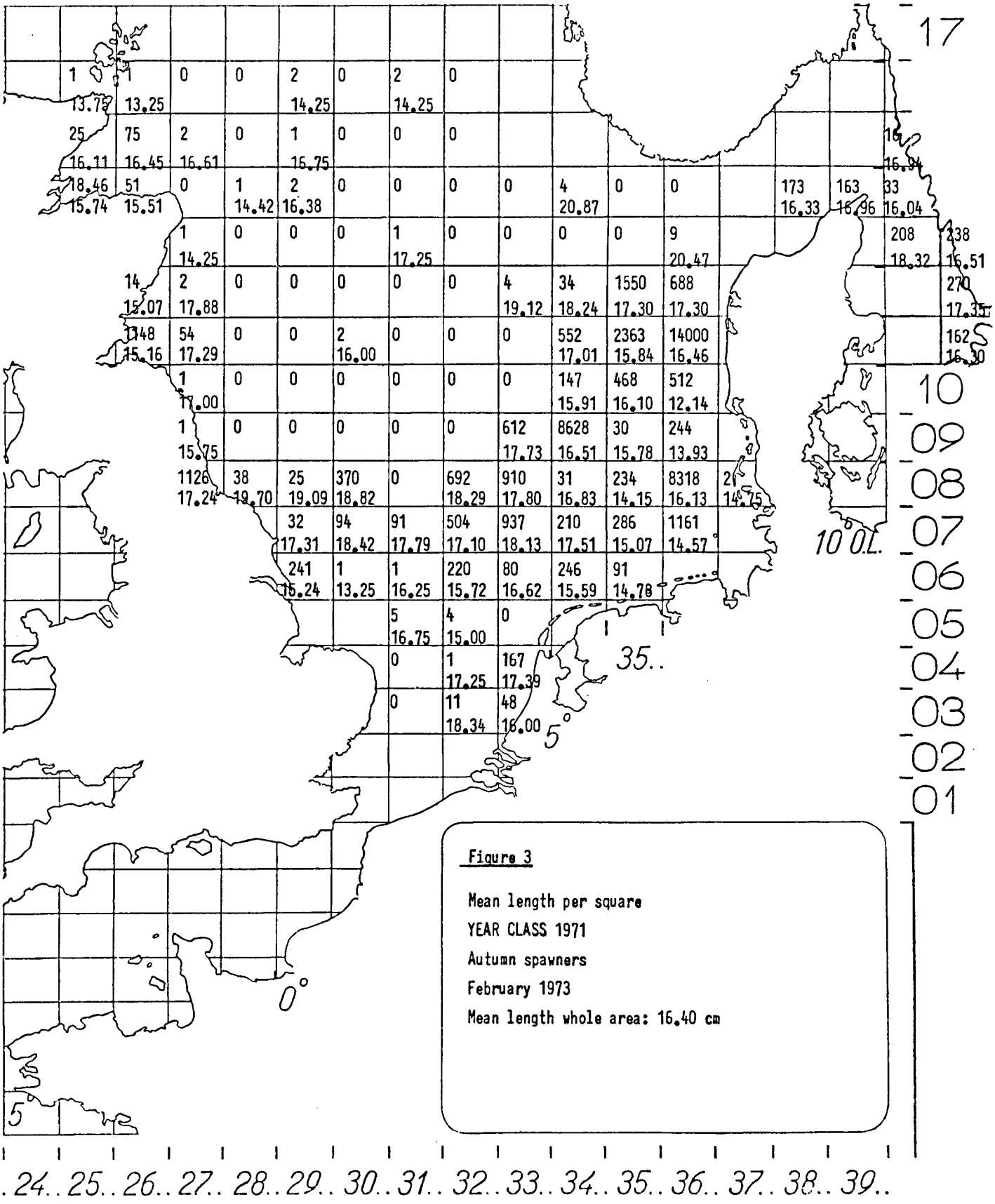

Figure 3

Mean length per square

YEAR CLASS 1971

Autumn spawners

February 1973

Mean length whole area: 16.40 cm

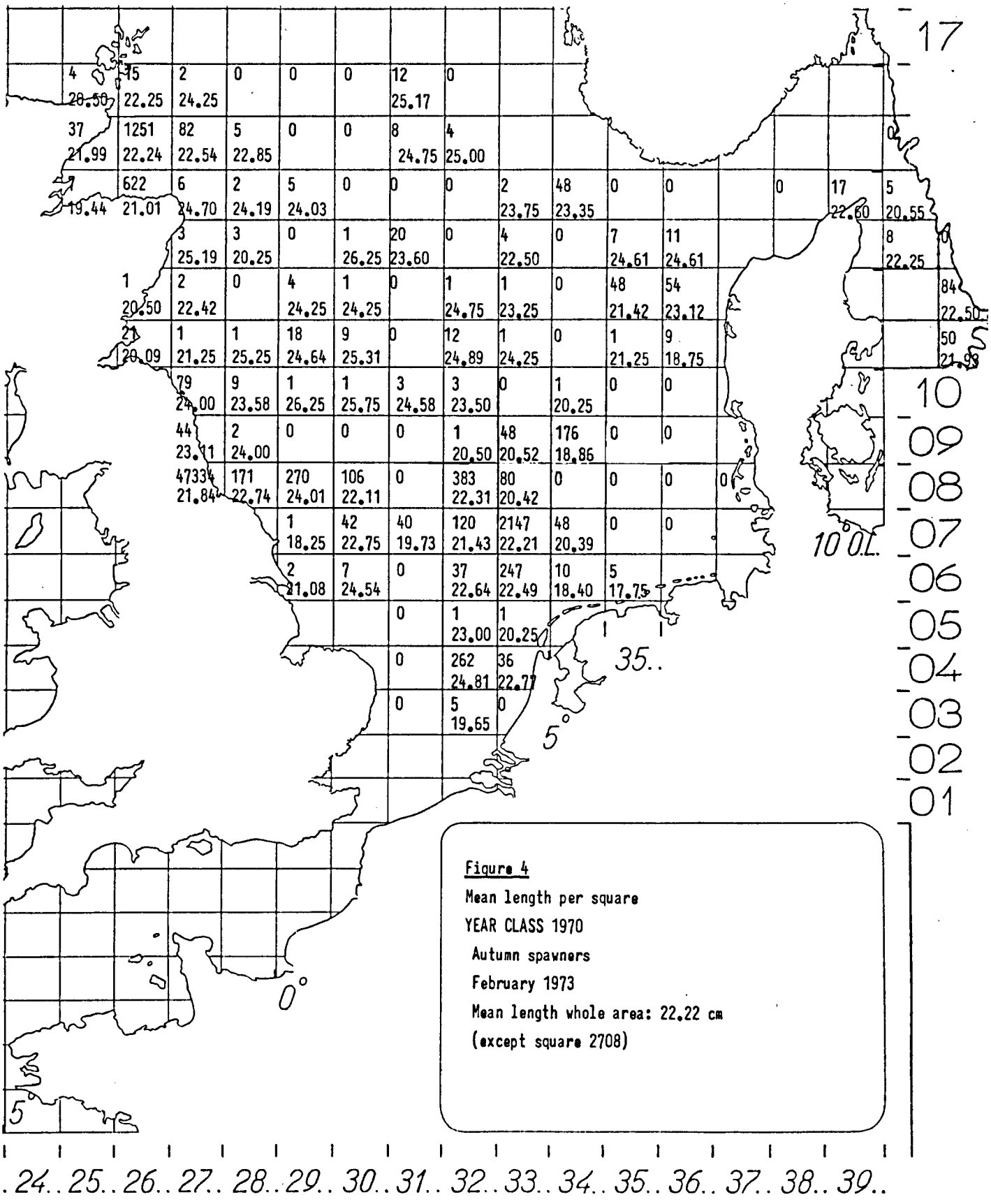

Figure 4

Mean length per square

YEAR CLASS 1970

Autumn spawners

February 1973

Mean length whole area: 22.22 cm

(except square 2708)

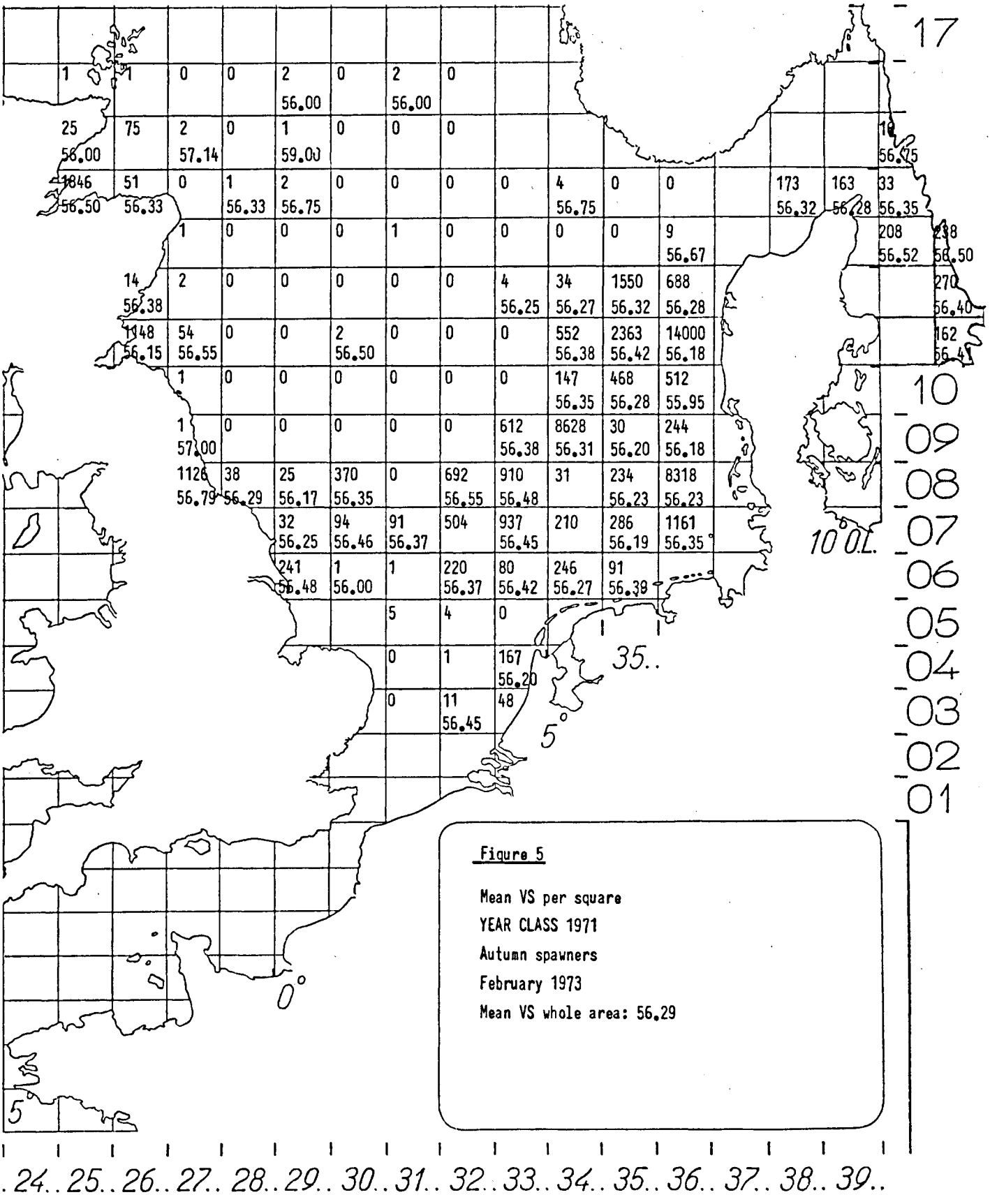

Figure 5

Mean VS per square
YEAR CLASS 1971
Autumn spawners
February 1973
Mean VS whole area: 56.29

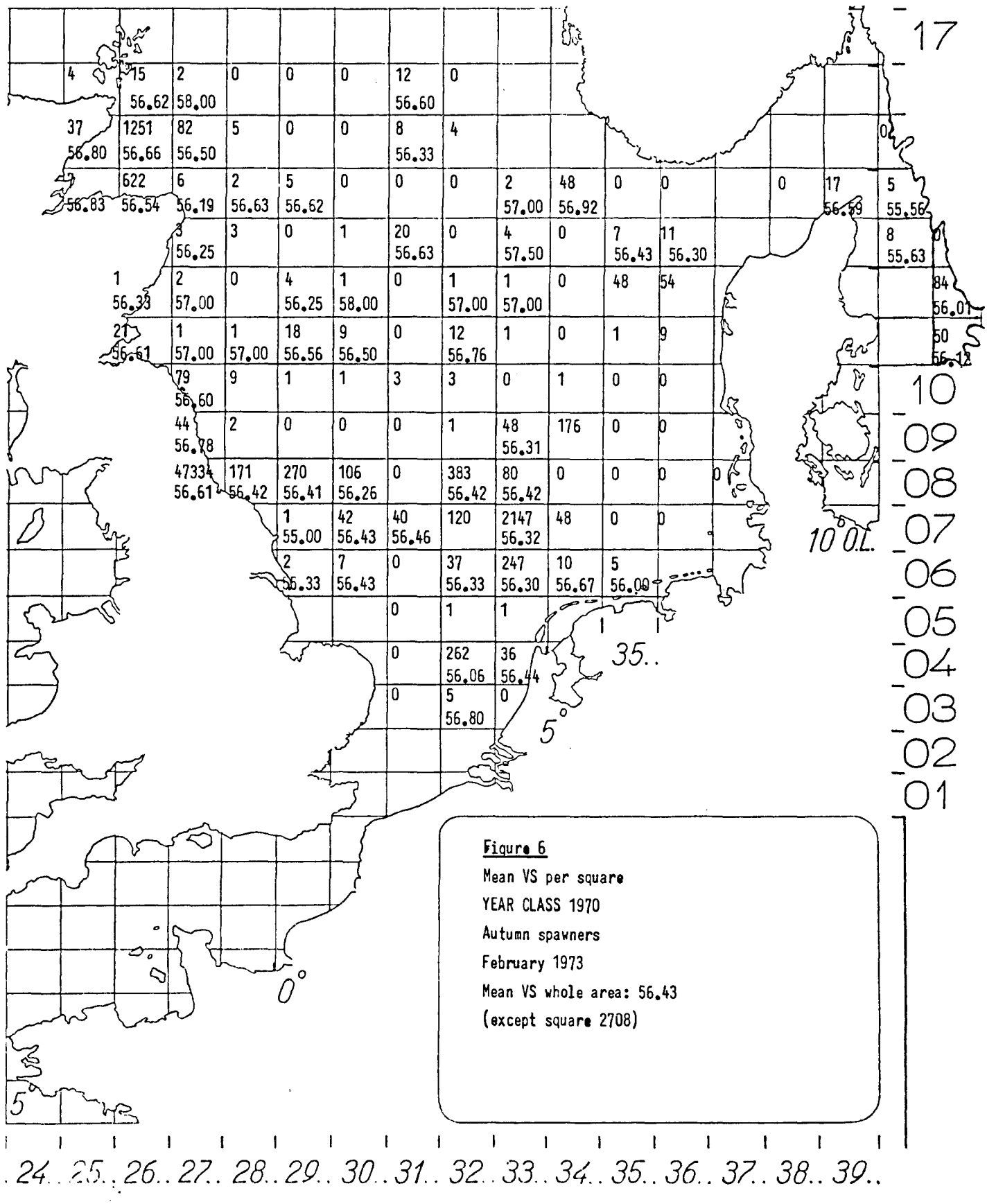

Figure 6

Mean VS per square

YEAR CLASS 1970

Autumn spawners

February 1973

Mean VS whole area: 56.43

(except square 2708)

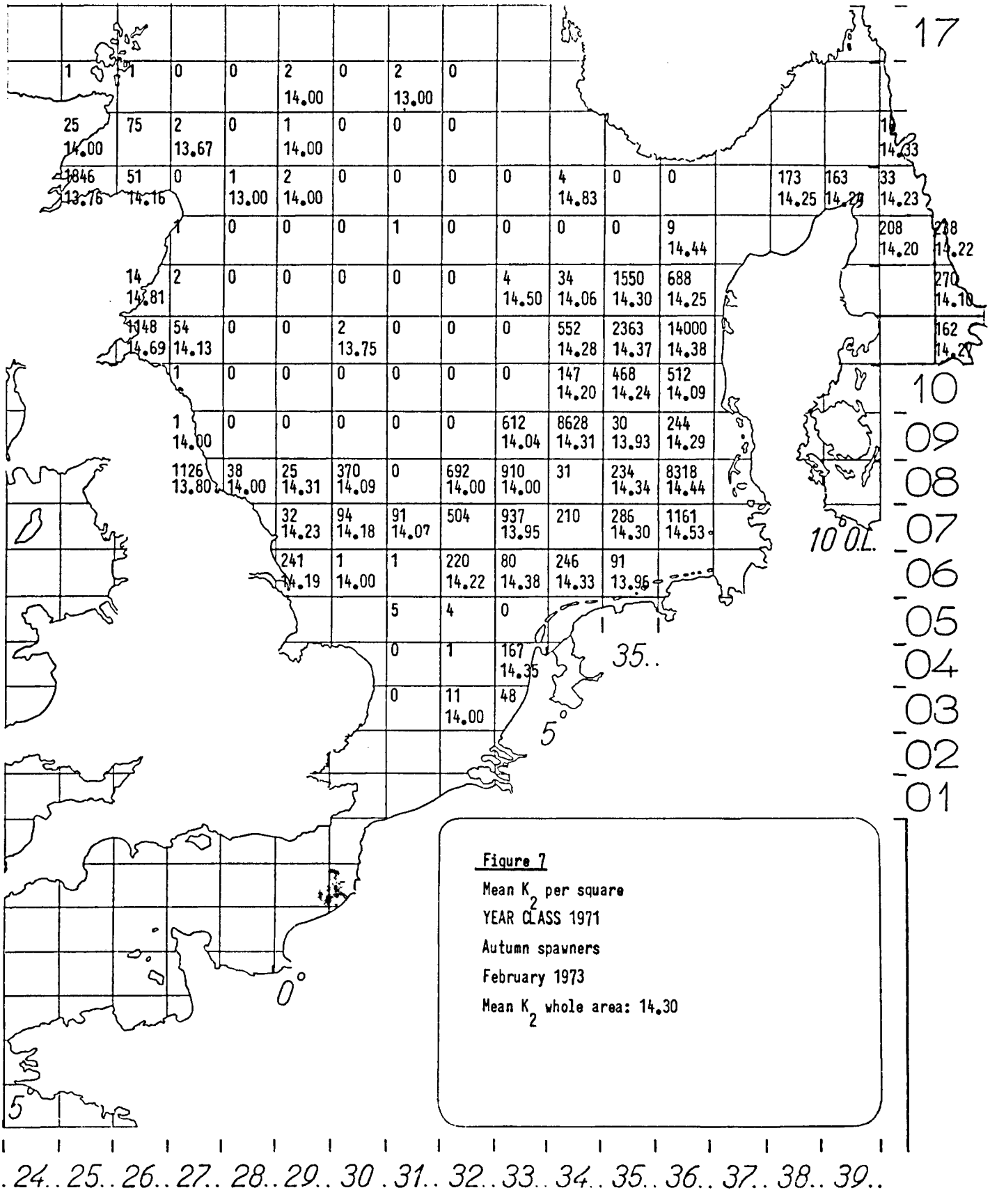

Figure 7

Mean K_2 per square

YEAR CLASS 1971

Autumn spawners

February 1973

Mean K_2 whole area: 14.30

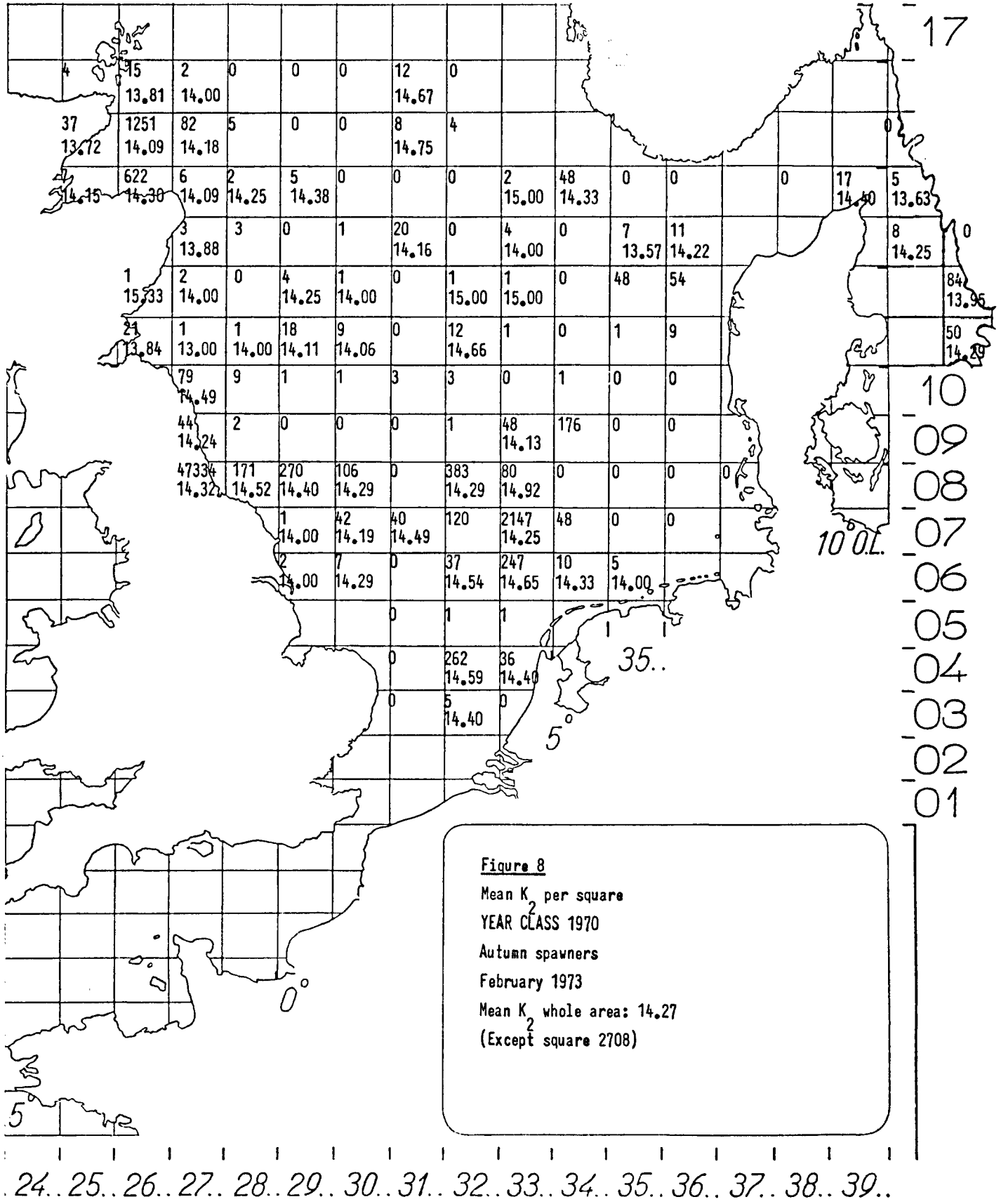

Figure 8

Mean K_2 per square

YEAR CLASS 1970

Autumn spawners

February 1973

Mean K_2 whole area: 14.27

(Except square 2708)