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Data on the Greenland Shrimp Fishery in NAFO Subarea 0+1 in 1980 Compared to Earlier Years

by

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Introduction

In 1975 a logbook system based on information from individual trawl hauls was introduced for the (at that time) seven trawlers of the Royal Greenland Trade Department. Including September 1980, a data base with data on about 60,000 hauls is now at hand, of which about 15,000 are from the shrimp fishery.

This paper presents data on the shrimp fishery at West Greenland based on the logbook system, including information on the geographic distribution of the fishery, catch rates and by-catches.

The Greenland Offshore Shrimp Fishery in 1980

The total allowable catch in 1980 of shrimp in NAFO Subarea 0+1 has been set at 29,500 tons, of which 22,000 tons have been allocated to Greenland.

Up to the beginning of November, 28 trawlers have been fishing on this Greenland allocation, a significant change in number of vessels compared to earlier years, where the trawlers of the Royal Greenland Trade Department accounted for the major part of the offshore Greenland shrimp catches. Since 1976, the Department has had 8 trawlers in operation, 6 of 722 GRT, 1 of 473 GRT and 1 of 134 GRT.

By the beginning of November 1980 the reported offshore Greenland shrimp catch in Subarea 1 totaled 21,410 tons, of which 8,274 tons was reported taken by the trawlers of the Trade Department, 13,136 tons by other Greenland trawlers (including 2 Danish trawlers fishing on Greenland allocation).

Geographical Distribution of the Fishery

Figure 1 (a-b) shows the distribution of shrimp hauls for the years 1975 to 1980 (including September) in the main fishing areas off the Greenland west coast in Subarea 1 based on logbook recording for 7 trawlers (473-722 GRT) of the Trade Department. In 1975 only 1 trawler was engaged in the shrimp fishery, and only for a few months of that year. In the following years, several of the trawlers changed from the traditional cod fishery to shrimp fishing for parts of the year. Table 1A and 1B shows the number of hours trawled by month in NAFO Division 1A and 1B respectively for the 6 trawlers of 722 GRT. From 1978 (Fig. 1d) the distribution of effort shows a northward movement of the fishery, indicating a displacement of the shrimp stock. Between 1979 (Fig. 1e) and 1980 (Fig. 1f, g, h) the shift becomes very significant. As the area north of 68°N since 1979 may be fished only by the Greenland fleet, this shift may be expected not to show up in data from other fleets.

In September 1978 the 433 GRT trawler *Nuk* of the Royal Greenland Trade Department carried out exploratory fishing in Div. 1A north of the fishing ground exploited by the offshore shrimp fishery at that time. Table 2 shows the position of hauls and catch rates obtained (kg/hour). Except for a single haul (in statistical unit LS014 - in an area exploited by small vessels about 20 GRT from the Disko Bay) the survey did not show catches of commercial size (for position of hauls refer to Fig. 1k).

Trends in Catch Rates

Figure 2 shows the variation in mean catch rate (kg/hour) from October 1975 to September 1980 in NAFO Division 1B on a monthly basis by the 6 trawlers of 722 GRT. Peak catch rates are present every year in the first half of the year, followed by declining catch rates throughout the year. In Table 3 the mean catch rates for each NAFO Division and month in a south to north latitude grid, showing the same declining catch rates throughout each single year, and also indicating a northward shift inside each year of the fishery, are given. In the individual year, peak catch rates are assumed to be based on concen-

trations of berried females in the spring, followed by a northward spread of the shrimp with resulting lower catch rates.

Figures 5-8 show the monthly distribution of effort and catch rates in statistical units of 7-1/2' x 15', also indicating the same behaviour of the shrimp stock. To adjust for the influence of a northward displacement over the years of the shrimp stock, catch rates in Divisions 1B (Fig. 2) and 1A (Fig. 3) on a monthly basis have been combined in Fig. 4. Tables 1A, 1B and 1C show the number of hours trawled per month by the 6 722 GRT trawlers in Division 1A, 1B and 1A+B respectively.

As ice conditions in the first half of the year may influence the access to the concentrations of berried females, and as quota regulations may influence the distribution of the fishery at the end of the year, the period from July to September has been chosen for comparison of catch rates from year to year.

The number of hours trawled and the mean catch per hour in Division 1B in July to September from 1976 to 1980 are:

	1976	1977	1978	1979	1980
Hrs trawled	1005	2966	3446	3588	1872
kg/hour	740	548	499	375	466

The figures show a declining mean catch rate from 1976 to 1979, the 1980 figure having raised almost to the 1978 level. Combining the catch and effort figures from Div. 1B and 1A the mean catch rates are almost identical to the figures for Div. 1B:

	1976	1977	1978	1979	1980
Hrs trawled	1007	3028	3456	3588	2437
kg/hour	746	541	499	375	477

Including Div. 1A in calculating the mean catch rate thus has little influence on mean catch rate even in 1980, when the high activity in Div. 1A showed up. The main part of this activity, however, occurred in June.

By-catch

Table 4 shows the by-catch of 6 trawlers of the Royal Greenland Trade Department as reported in logbooks. The figures show a general decline in the by-catch of redfishes over the years included.

According to observers reports, Greenland shark is commonly caught in the shrimp fishery, at times as much as one shark in almost every haul. As shark are always killed by the crew, this catch may greatly influence the stock. Further details on geographical and time distribution of the by-catch of Greenland shark has not been elaborated at present.

Acknowledgements

The help of Captains and crews of the trawlers of the Royal Greenland Trade Department has been valuable for the establishment of the data base and for the success of the work of observers. Also the technical staff of the Greenland Fisheries Investigations should be thanked for its great effort in preparing the data in time for the Special Meeting on Shrimp.

Table 1. Number of hours trawled per month and year from October 1975 through September 1980 in NAFO Division 1A, 1B and 1A+B, based on logbook information by six trawlers (722 GRT) of the Royal Greenland Trade Department.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<u>1A</u>												
1975												
1976												
1977												
1978												
1979	77	91	65	143								
1980	42	121	93	46	70	979	171	199	195			
<u>1B</u>												
1975												
1976	12				7	252	326	309	370	50	331	183
1977	164	84	245	391	643	839	874	1053	1039	329	1297	957
1978	233			13	948	1209	1226	1326	894	1282	1199	626
1979	27	18	823	752	991	972	1191	1521	876	911	922	891
1980	768	624	685	670	1330	131	469	822	581			
<u>1A+1B</u>												
1975												
1976	12				7	252	326	311	370	50	331	183
1977	164	84	245	391	643	839	874	1057	1097	1297	1293	957
1978	233			13	948	1209	1226	1336	894	1282	1199	726
1979	164	18	823	842	1058	1115	1191	1521	876	911	922	891
1980	810	745	778	716	1400	1110	640	1021	776			

Table 2. Mean catch per hour (kg/hour) obtained by the 433 GRT trawler *Nuk* during exploratory shrimp fishing in NAFO Division 1A in September 1978.

Date/haul no.	depth, m	Rec. unit	mean time	shrimp, kg/h	No./kg
780904/1	244	MV434	10:20	8.3	164
04/2	282	MT438	14:10	15.4	155
04/3	194	MS438	17:20	0	
04/4	226	MK004	00:10	0	
05/1	267	MZ002	13:40	51	206
05/2	301	MH440	16:40	40	150
05/3	282	MG002	20:50	45	188
06/4	304	ME434	19:40	139	
06/1	395	MB436	07:00	1	111
06/3	555	MB432	13:30	6	95
07/3	345	MA005	13:10	28	145
07/4	639	LZ007	18:00	32	
08/1	614	LZ009	05:30	3	107
08/2	602	LZ010	04:10	40	132
08/3	617	LZ011	15:40	40	
08/4	620	LZ014	14:30	75	118
07/1	536	LX003	05:30	10	151
07/2	572	LV004	04:20	2	
09/1	269	LZ014	06:30	52.0	168

Table 3. Mean catch of shrimp per hour (kg/hour) from October 1975 through September 1980 in a south to north grid (7-1/2 degree latitude scale), as reported in logbooks of six trawlers of the Royal Greenland Trade Department.

Table 3. Cont'd.

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Table 3: Cont'd.

Table 4. Reported by-catch in the shrimp fishery by month, NAFO Division and species from 1977 to September 1980 in logbooks of six trawlers (722 GRT) of The Royal Greenland Trade Department.

	Species	7703	7708	7709	7710	7711	7712	7801	7804	7805	7806	7807	7808	7809	7810	7811	7812
0A	Redfishes																
0B	Redfishes																
1A	Redfishes																
1B	Grl. Cod Cod																
	Wolfishes																
	Grl. Halibut																
	Mixed Spec.																
1C	Grl. Cod Cod																
	Wolfishes																
	A. Plaice																
	Grl. Halibut																
	Redfishes																
1D	Cod A. Plaice Grl. Halibut Redfishes																
	Grl. Cod Cod																
	Wolfishes																
	A. Plaice																
	Grl. Halibut																
	Mixed Spec.																
Tot.	Grl. Cod Cod																
	Wolfishes																
	A. Plaice																
	Grl. Halibut																
	Redfishes																
	Mixed Spec.																
All Spec.	6.5	10.8	115.0	296.7	276.9	209.9	53.2	17.9	207.7	161.8	107.8	4.1	61.7	59.5	147.9	166.1	42.0

Table 4. Cont'd.

	Species	7901	7902	7903	7904	7905	7906	7907	7908	7909	7910	7911	7912
0A	Redfishes							3.2		70.8	3.5	51.5	
0B	Redfishes									0.2			
1A	Redfishes	2.3				0.5	3.0						
1B	Grl. Cod Cod Wolffishes Grl. Halibut Redfishes Mixed spec.	0.8	6.0	72.2	192.5	93.3	81.8	58.8	45.7	119.5	63.1	73.6	54.5
1C	Grl. Cod Cod Wolffishes A. Plaice Grl. Halibut Redfishes	3.4	1.5	4.0	0.5	1.4				0.5	0.8	2.4	12.8
1D	Cod A. Plaice Grl. Halibut Redfishes						0.2						
Tot.	Grl. Cod Cod Wolffishes A. Plaice Grl. Halibut Redfishes Mixed spec.	3.1	9.4	73.7	196.5	94.3	87.4	62.0	45.7	191.0	67.4	127.5	67.3
	All. spec.	3.1	9.4	73.7	196.5	94.3	88.8	64.7	45.7	192.8	69.0	129.7	67.3

	Species	8001	8002	8003	8004	8005	8006	8007	8008	8009	8010	
0A	Redfishes								11.1	9.2	68.0	
0B	Redfishes											
1A	Redfishes	2.5	8.2	2.2	4.3	1.0	0.3					
1B	Grl. Cod Cod Wolffishes Grl. Halibut Redfishes Mixed spec.	70.8	52.2	71.1	39.9	65.7	2.3	2.7	11.3	24.9		
1C	Grl. Cod Cod Wolffishes A. Plaice Grl. Halibut Redfishes	1.0		16.0	5.4	0.6	0.4	8.2	9.2			
1D	Cod A. Plaice Grl. Halibut Redfishes				0.1				0.1			
Tot.	Grl. Cod Cod Wolffishes A. Plaice Grl. Halibut Redfishes Mixed spec.	74.3	60.4	89.3	49.7	67.3	10.8	23.0	20.6	92.9		
	All. spec.	74.3	60.4	89.3	49.7	67.3	20.7	34.9	22.2	92.9		

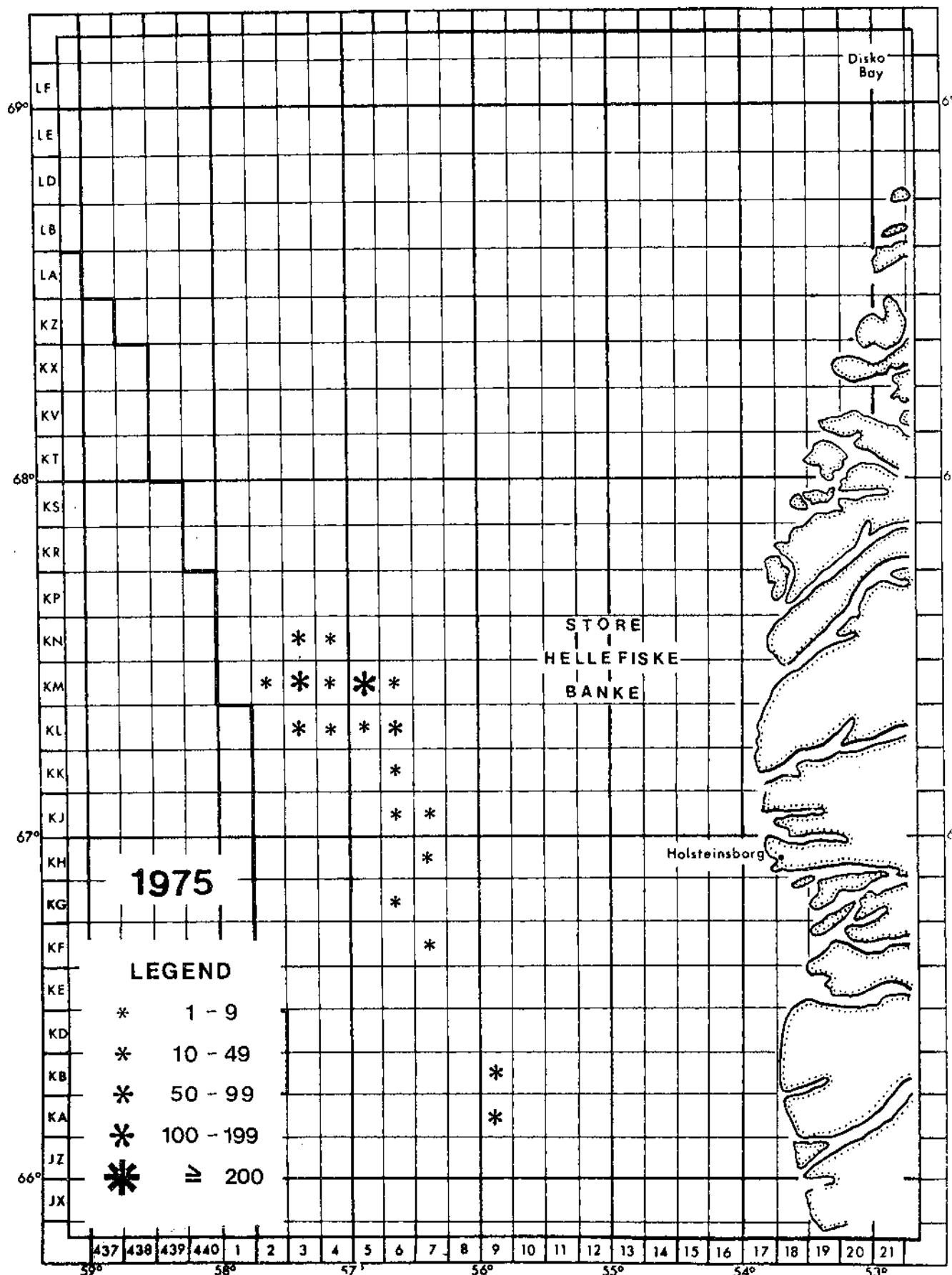


Fig. 1a. Distribution of hauls by seven trawlers (473-722 GRT) of the Royal Greenland Trade Department in NAFO Subarea 1 between 65°50'N and 69°10'N in 1975

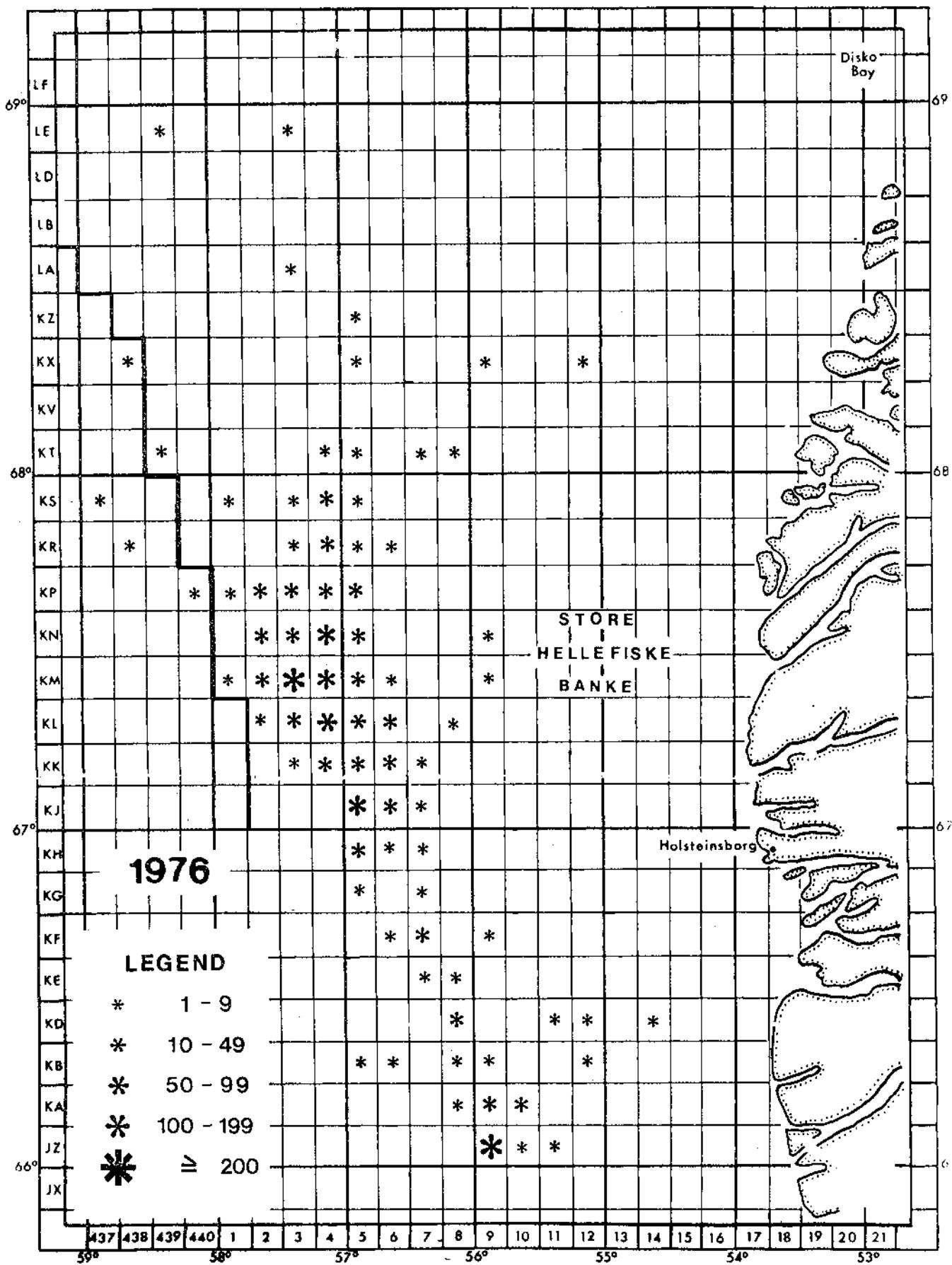


Fig. 1b. Distribution of hauls by seven trawlers (437-722 GRT) of the Royal Greenland Trade Department in NAFO Subarea 1 between 65:50'N and 69:10'N in 1976

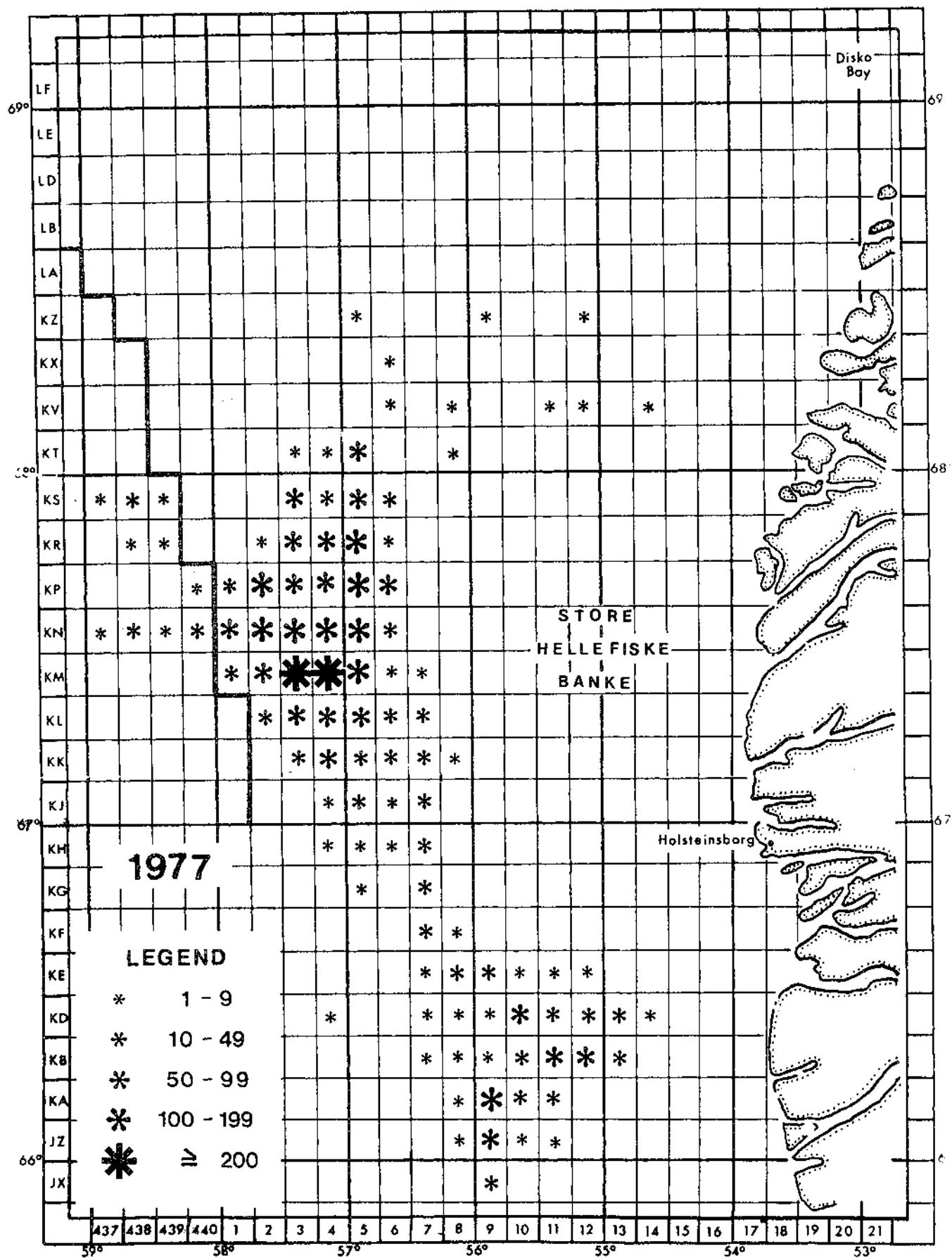


Fig. 1c. Distribution of hauls by seven trawlers (473-722 GRT) of the Royal Greenland Trade Department in NAFO Subarea 1 between 65:50'N and 69:10'N in 1977

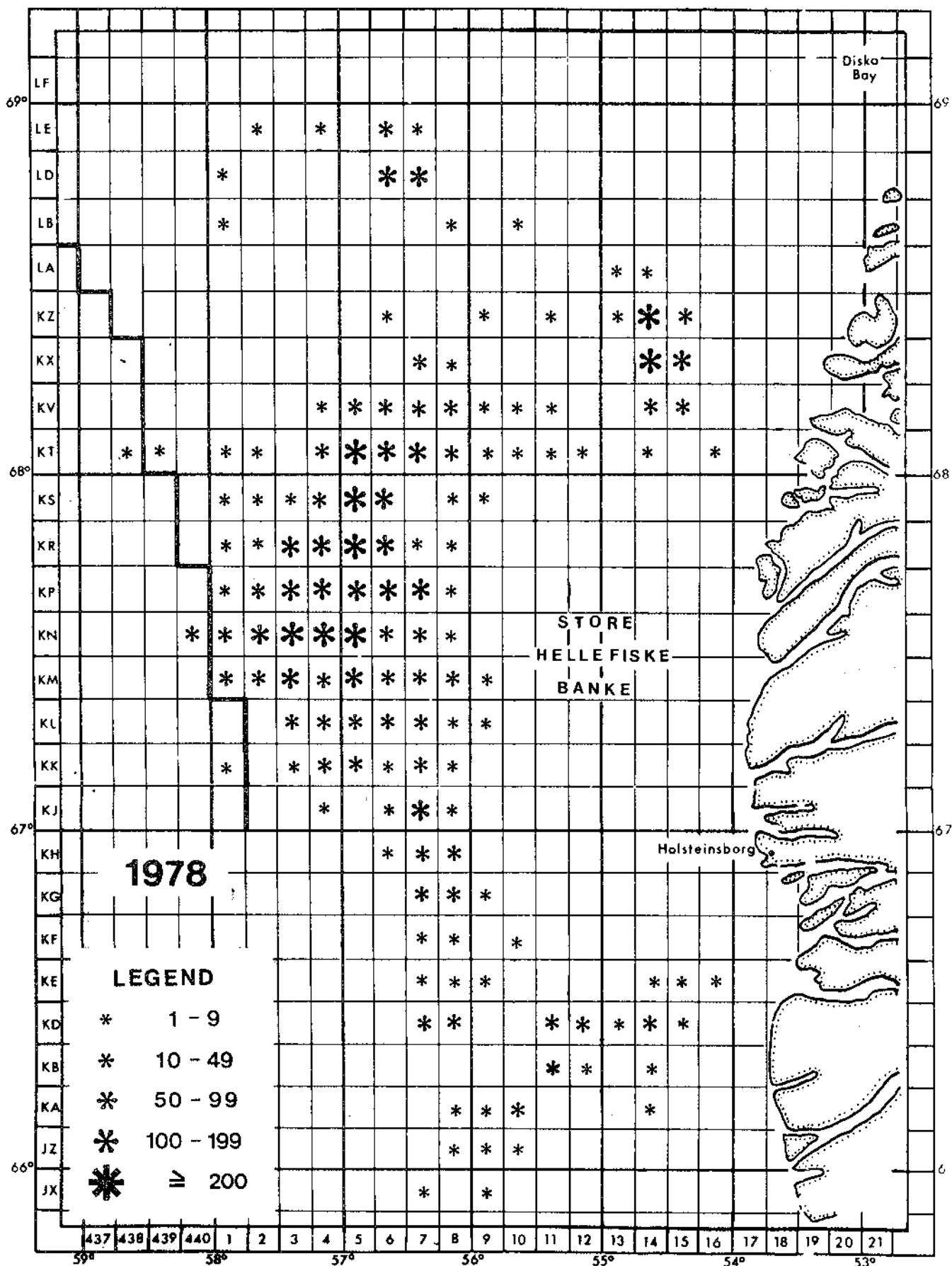


Fig. 1d. Distribution of hauls by seven trawlers (473-722 GRT) of the Royal Greenland Trade Department in NAFO Subarea 1 between 65:50'N and 69:10'N in 1978.

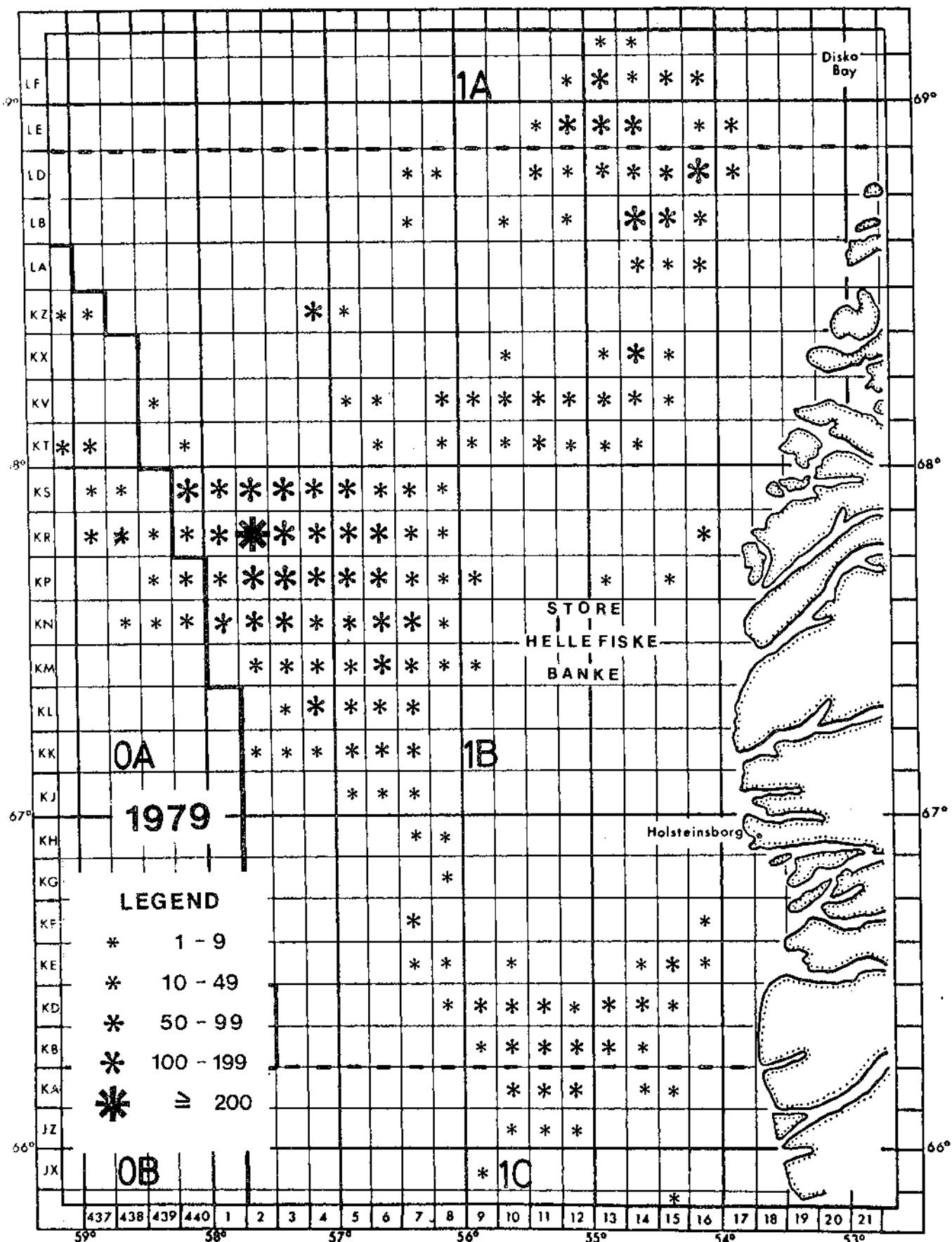


Fig. 1e. Distribution of hauls by seven trawlers (473-722 GRT) of the Royal Greenland Trade Department in NAFO Subarea 1 between 65:50'N and 69:10'N in 1979.

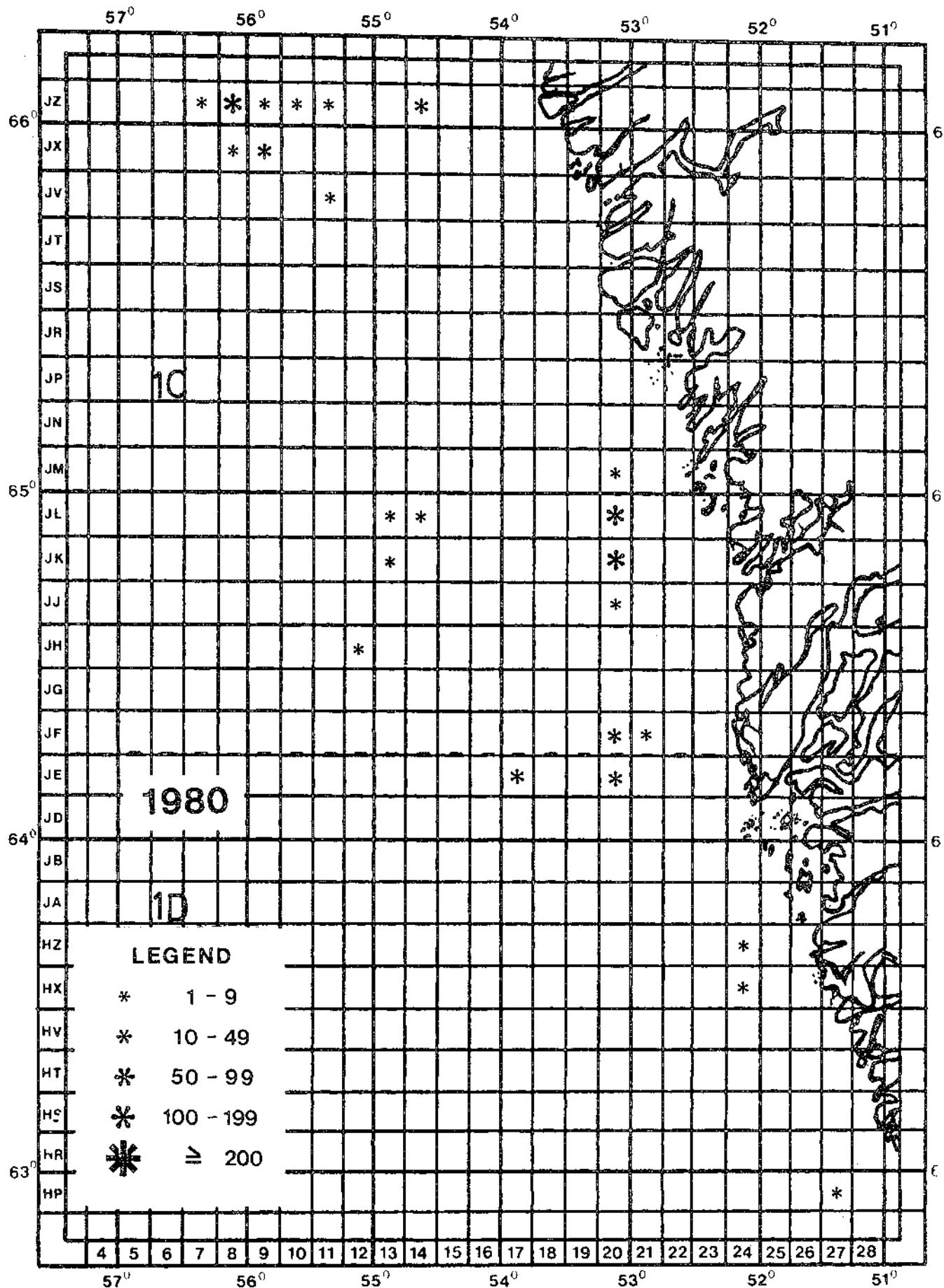


Fig. 1f. Distribution of hauls by seven trawlers (473-722 GRT) of the Royal Greenland Trade Department in NAFO Subarea 1 between 62°50'N and 66°10'N in 1980 (including October).

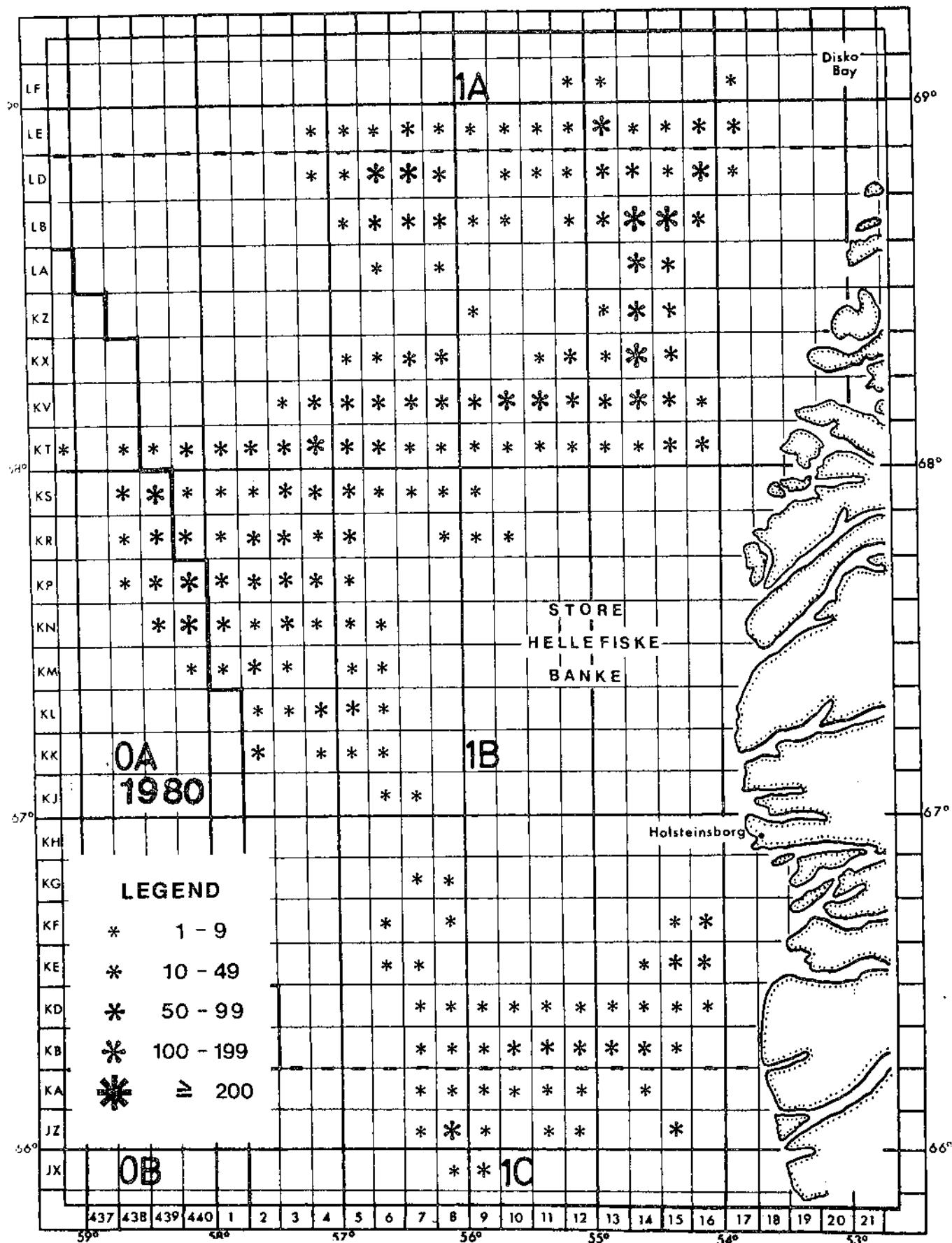


Fig. 19. Distribution of hauls by seven trawlers (473-722 GRT) of the Royal Greenland Trade Department in NAFO Subarea 1 between 65°50'N and 69°10'N in 1980 (including October).

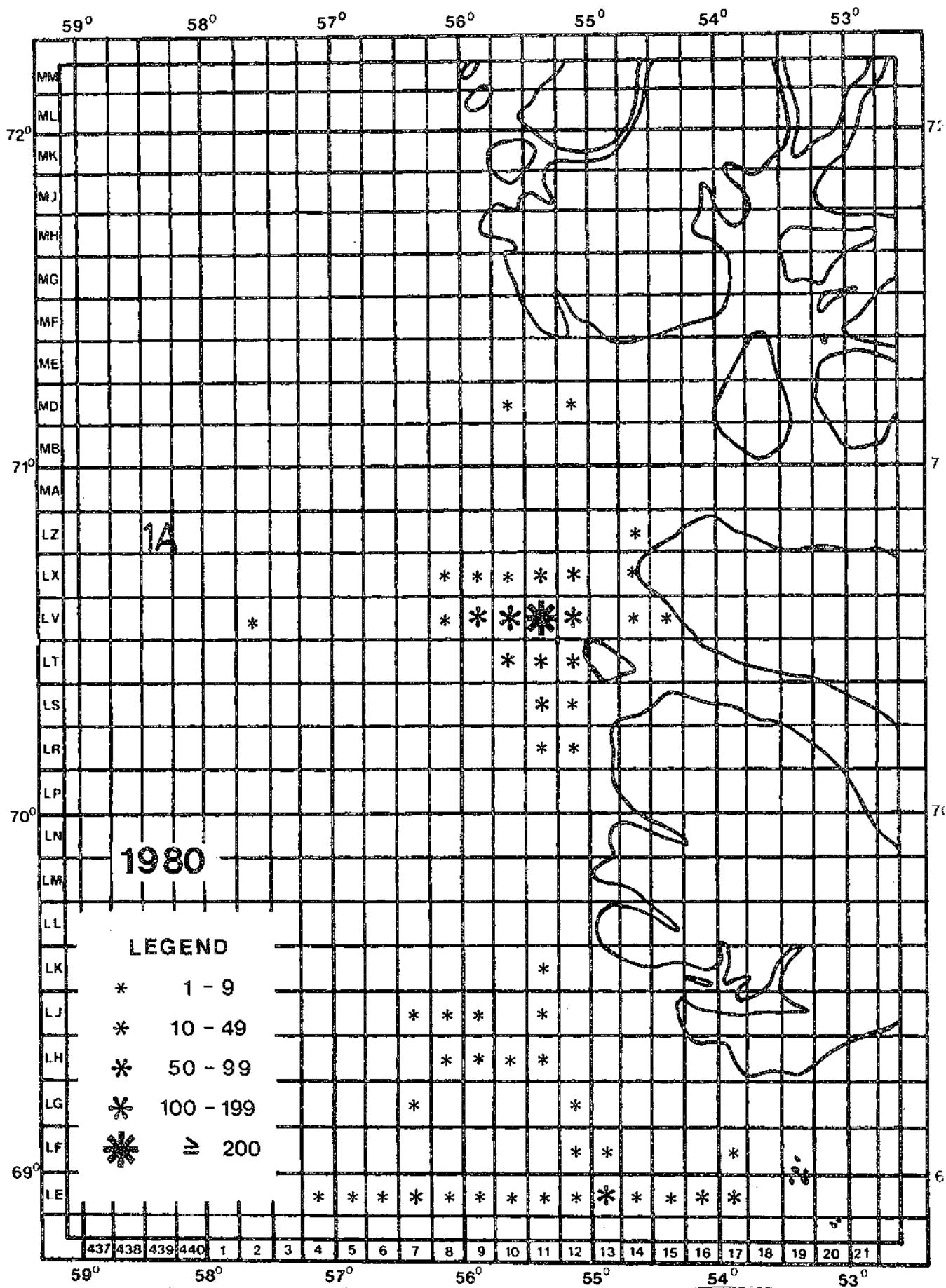


Fig. 1h. Distribution of hauls by seven trawlers (437-722 GRT) of the Royal Greenland Trade Department in NAFO Subarea 1 between 68:50'N and 72:10'N in 1980 (including October).

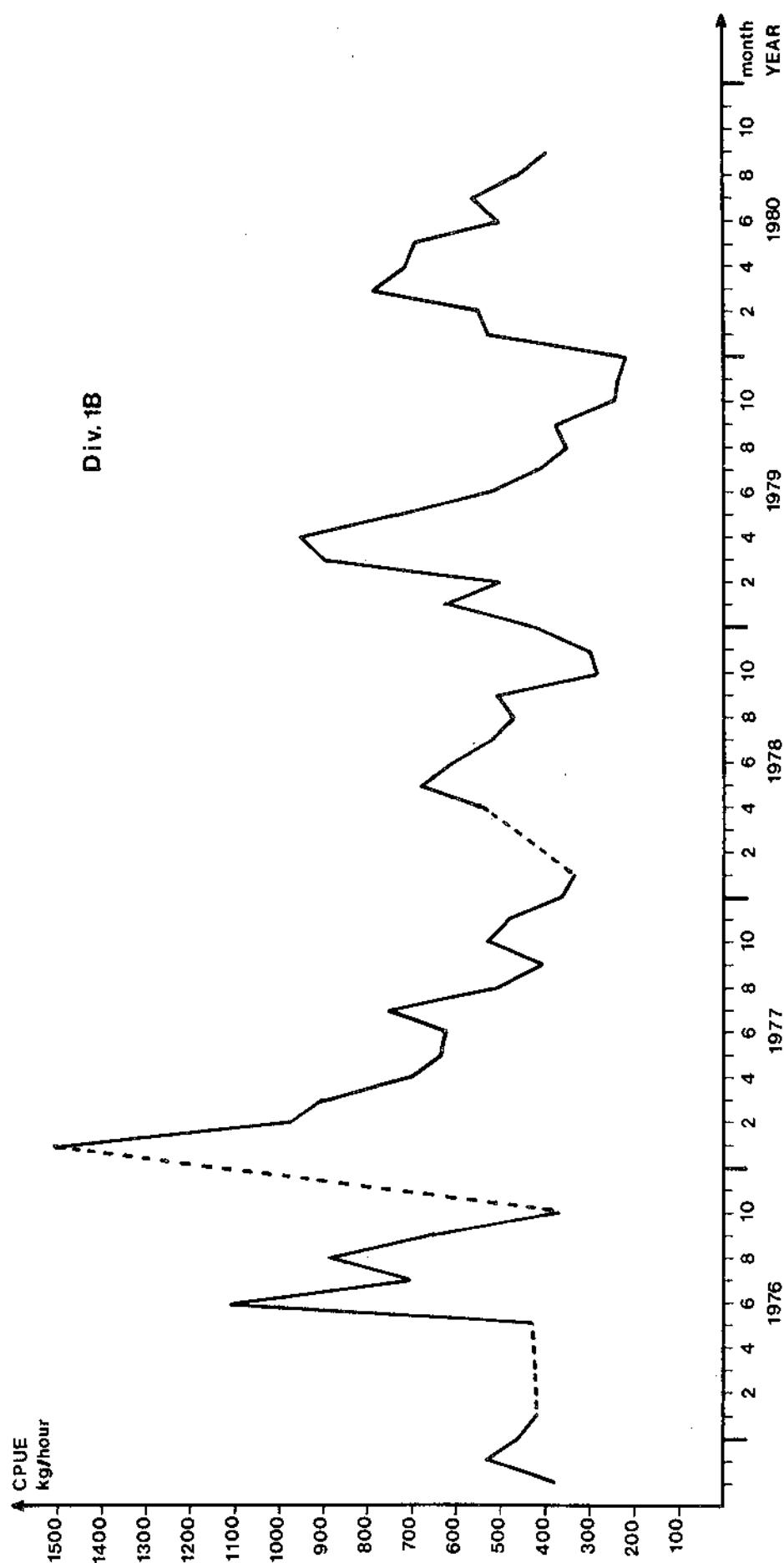


Fig. 2. Monthly mean catch per unit effort (kg/hour) in Division 1B from October 1975 to September 1980 based on logbook information from six trawlers (722 GRT) of the Royal Greenland Trade Department (Table 1B shows the corresponding number of hours trawled).

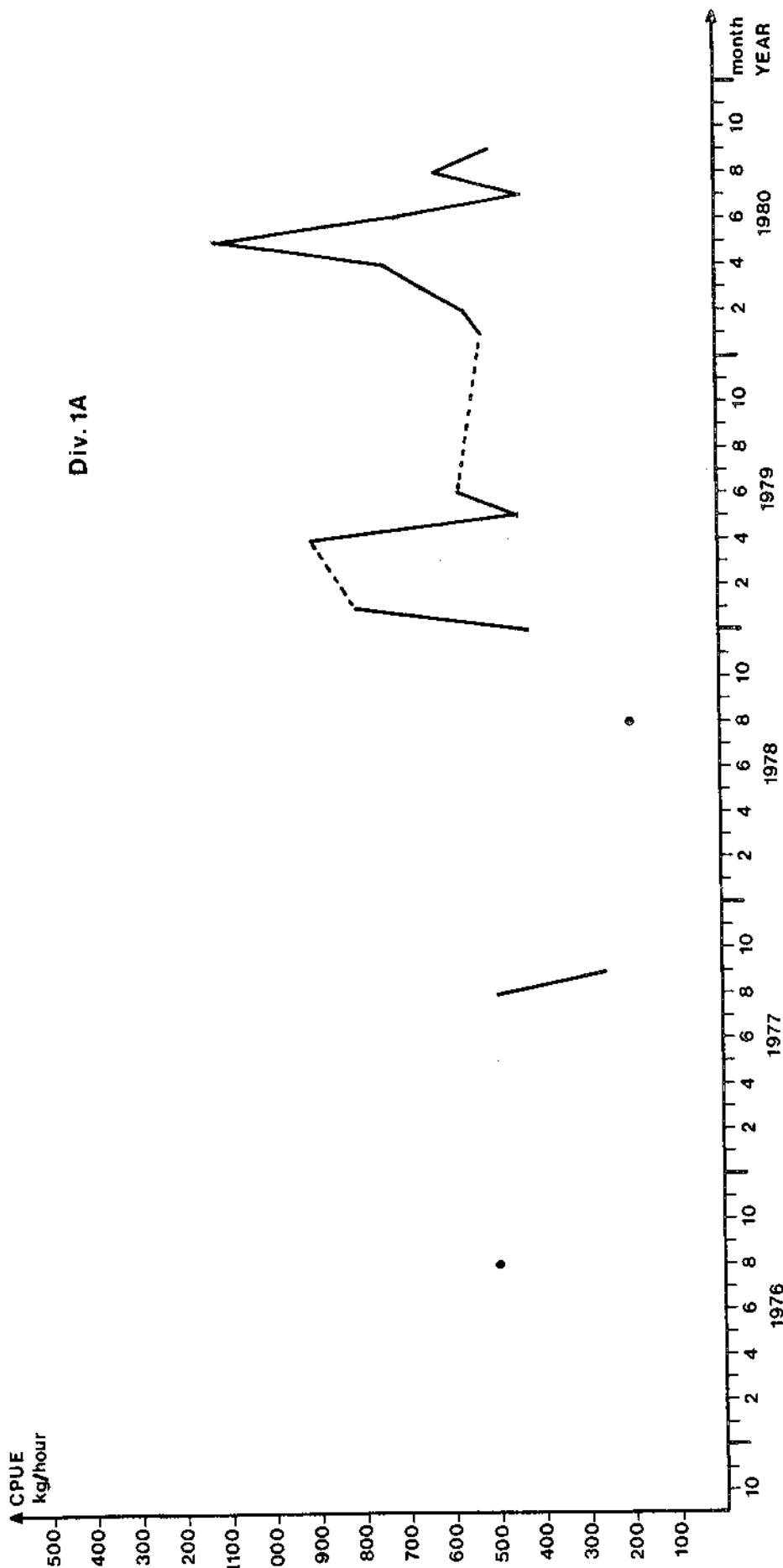


Fig. 3. Monthly mean catch per unit effort (kg/hour) in Division 1A from August 1976 to September 1980 based on logbook information from six trawlers (722 GRT) of the Royal Greenland Trade Department (Table 1A shows the corresponding number of hours travelled).

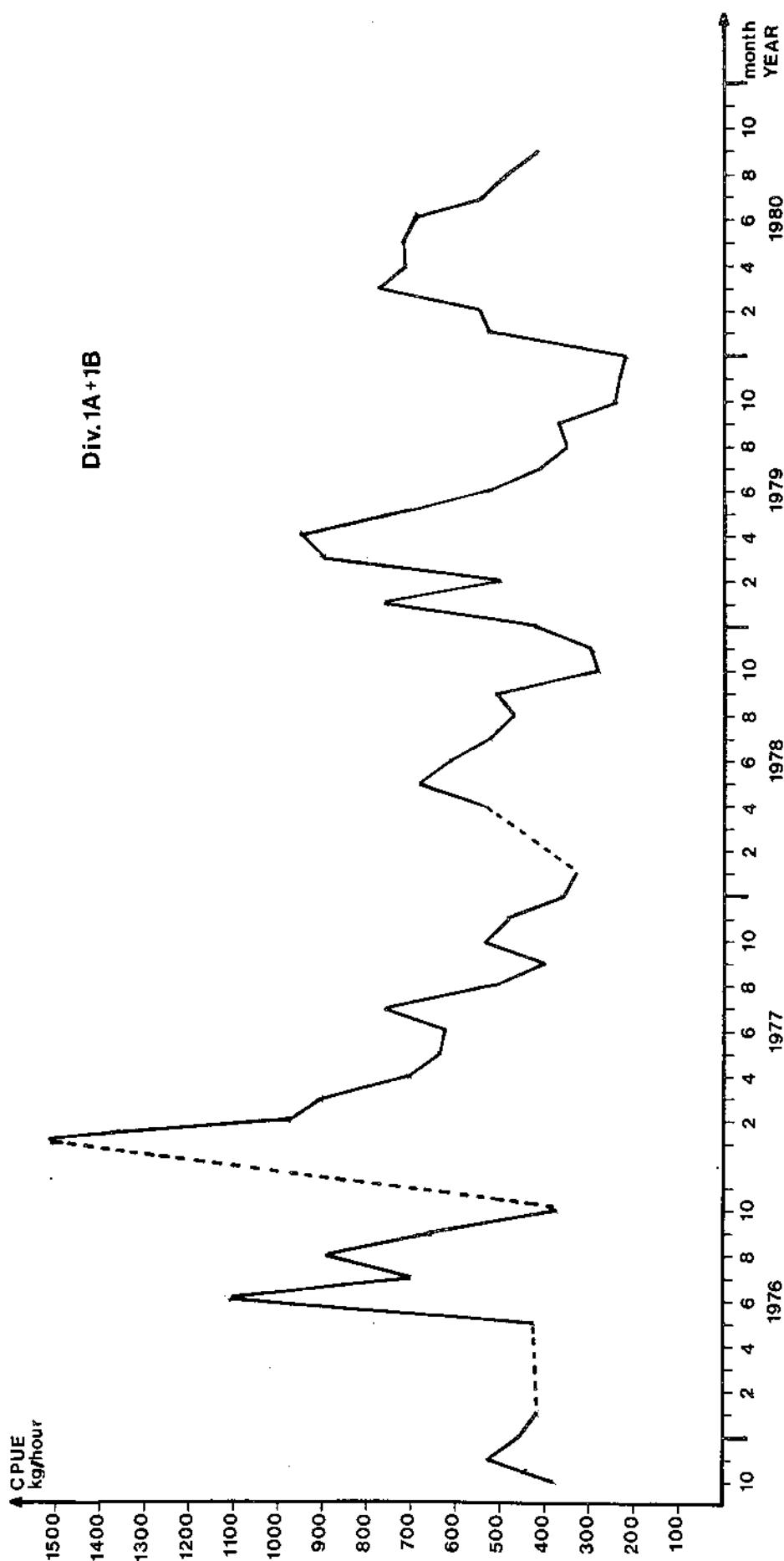


Fig. 4. Monthly mean catch per unit effort (kg/hour) in Division A+B from October 1975 to September 1980 based on logbook information from six trawlers (722 GRT) of the Royal Greenland Trade Department (Table 1C shows the corresponding number of hours trawled).

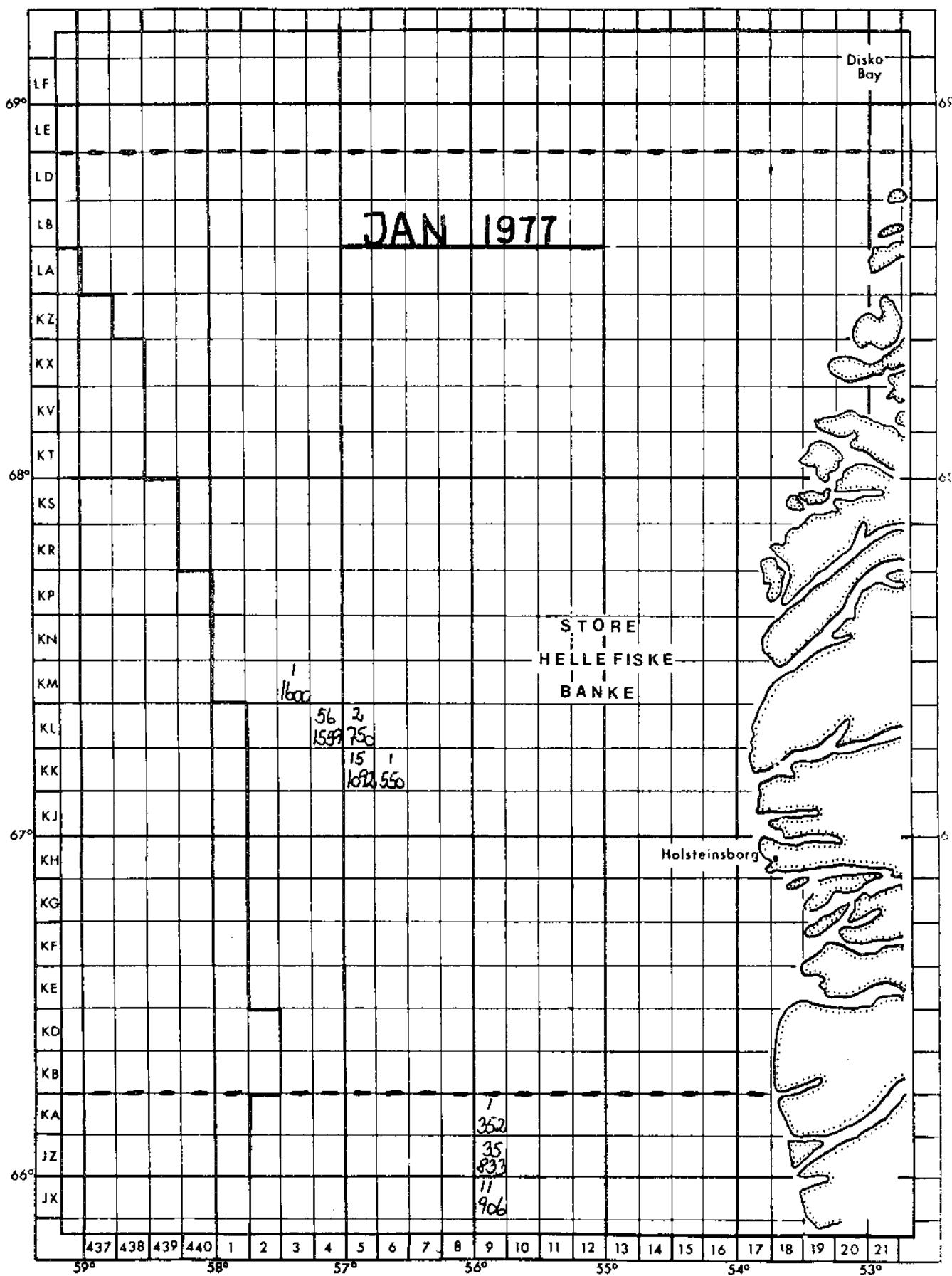


Fig. 5a. Distribution of effort and mean catch per hour in January 1977 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

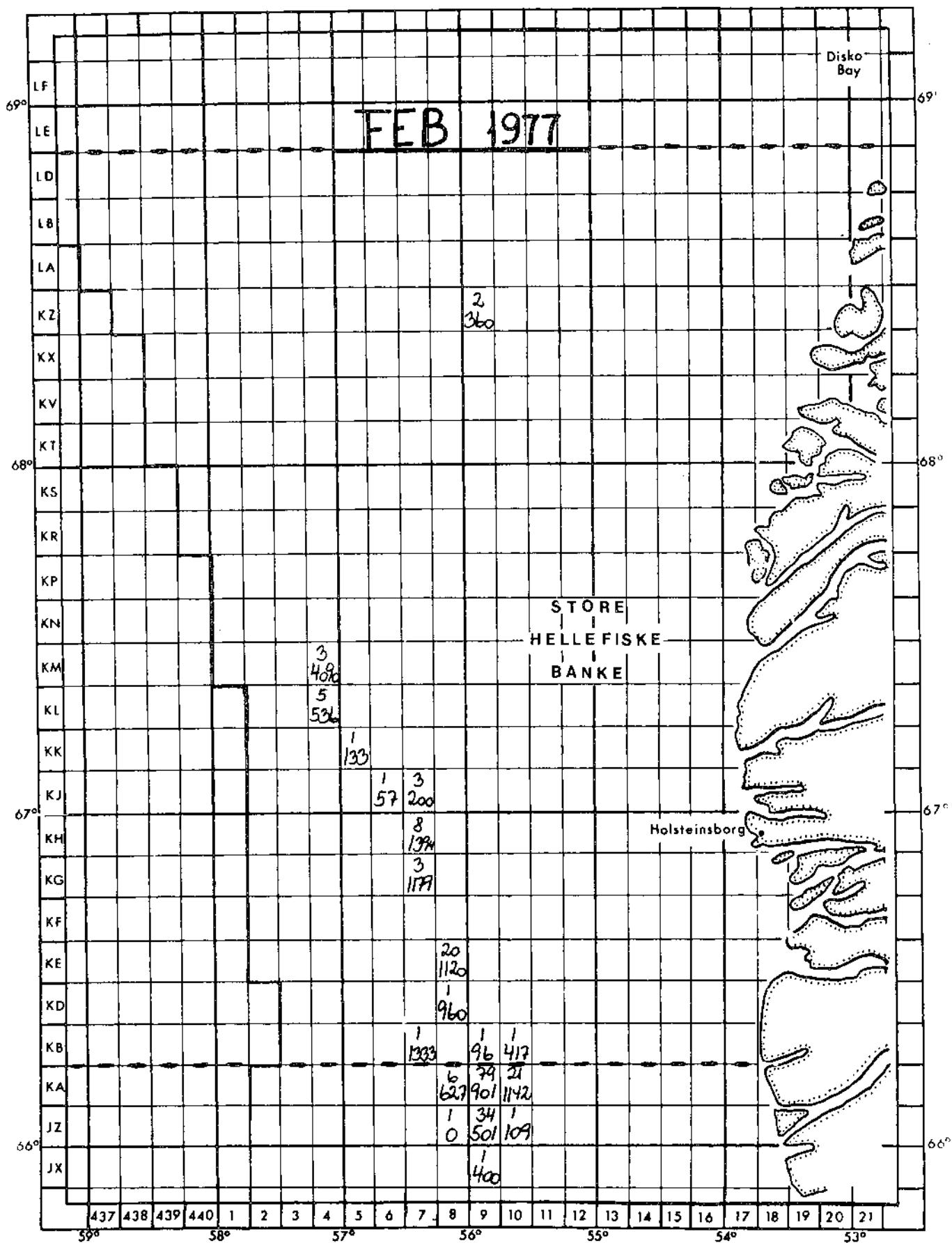


Fig. 5b. Distribution of effort and mean catch per hour in February 1977 in NAFO Subarea 1 between 65°50'N and 69°10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

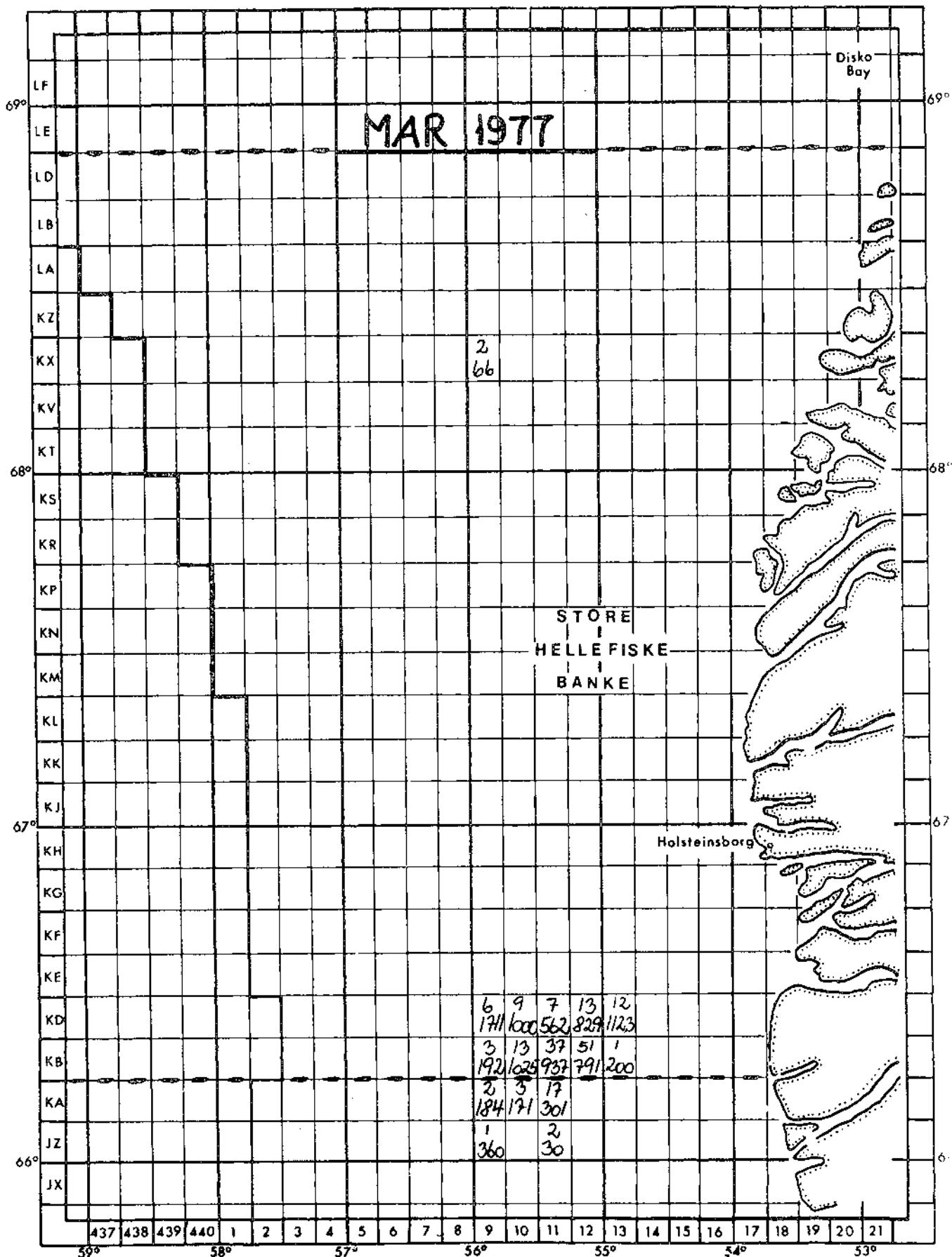


Fig. 5c. Distribution of effort and mean catch per hour in March 1977 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls; lower figure is the mean catch per hour (kg/hour).

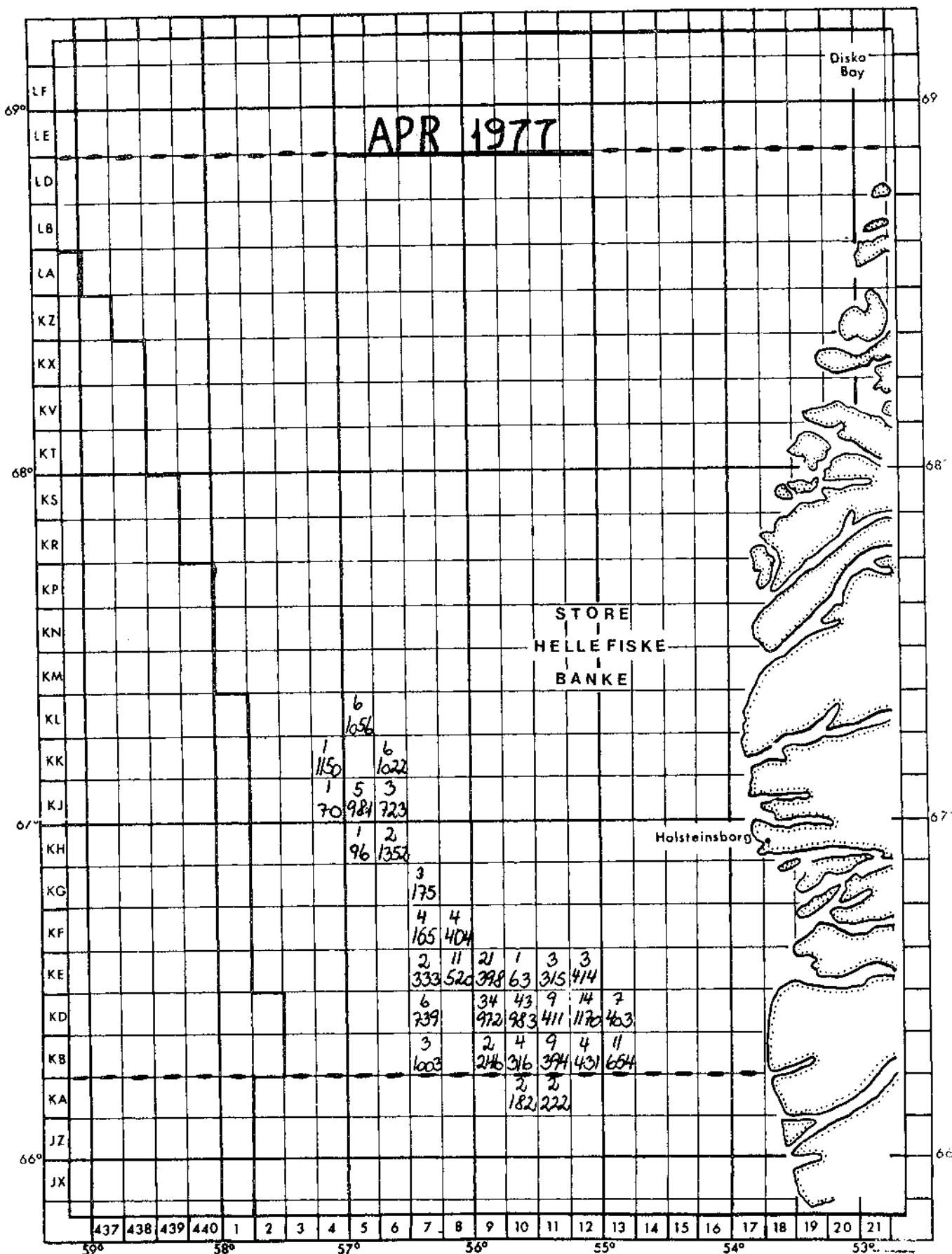


Fig. 5d. Distribution of effort and mean catch per hour in April 1977 in NAFO Subarea 1 between 65:0'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

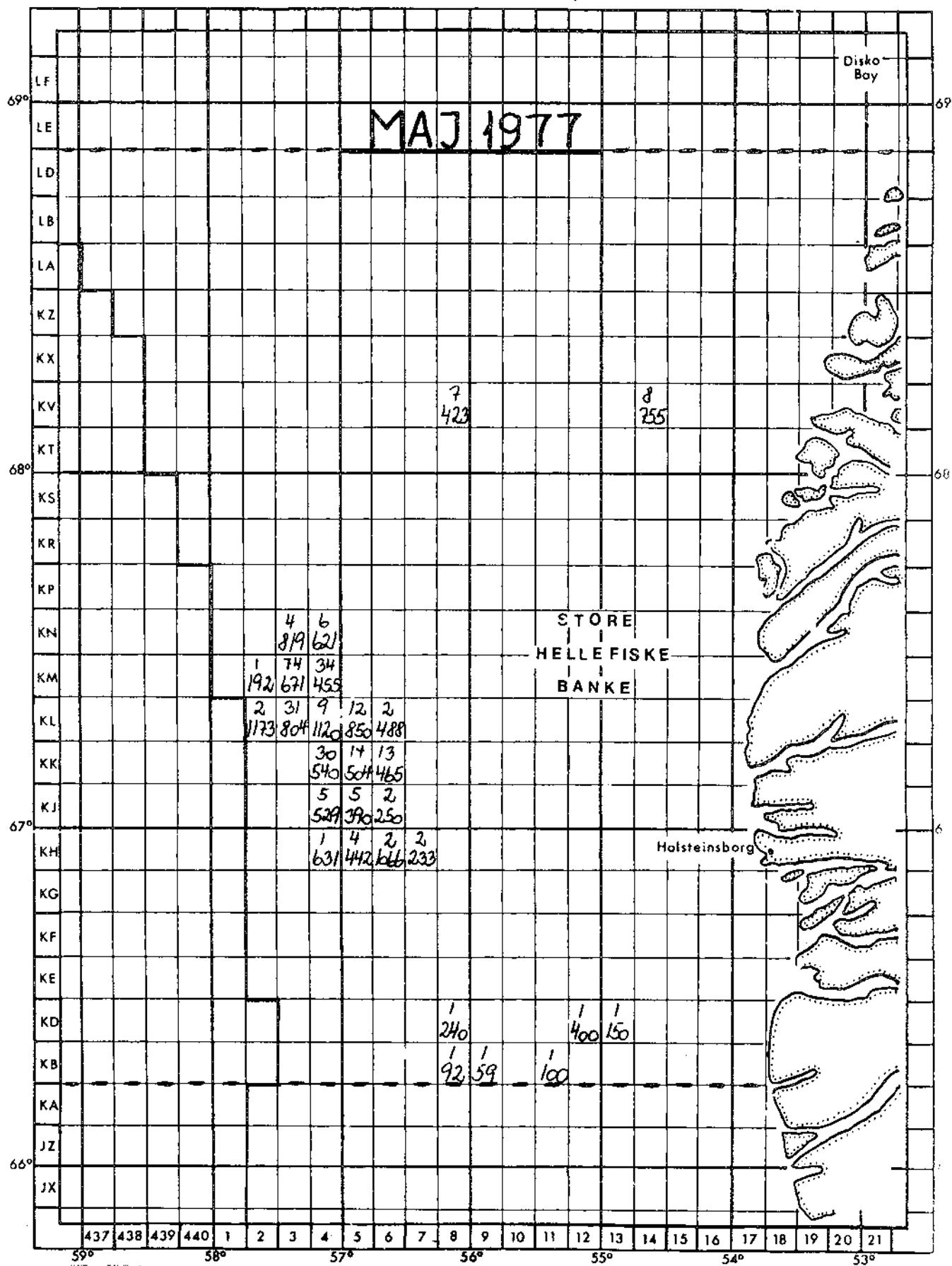


Fig. 54. Distribution of effort and mean catch per hour in May 1977 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls; lower figure is the mean catch per hour (kg/hour).

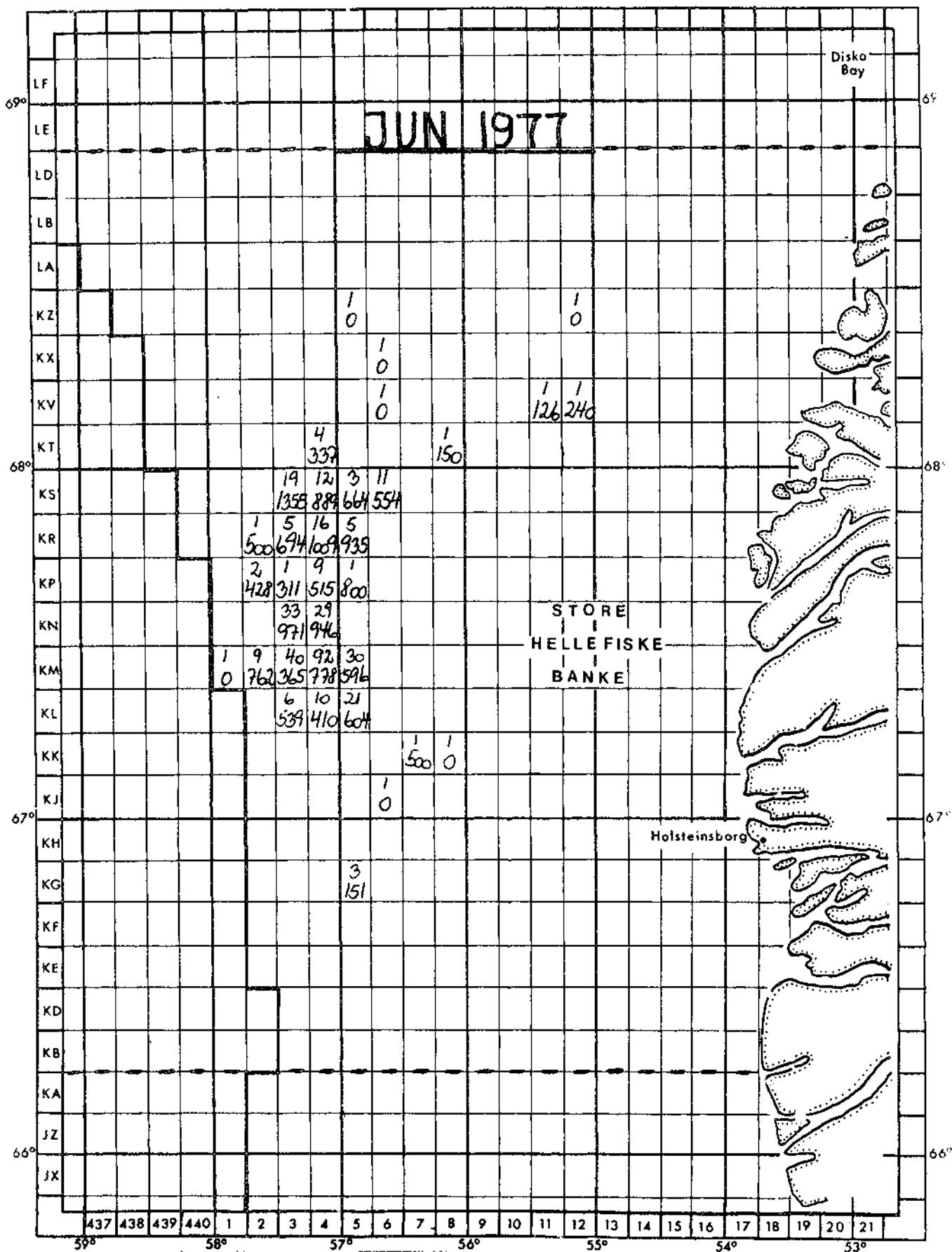


Fig. 56. Distribution of effort and mean catch per hour in June 1977 in NAFO Subarea 1 between 65°50'N and 69°10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

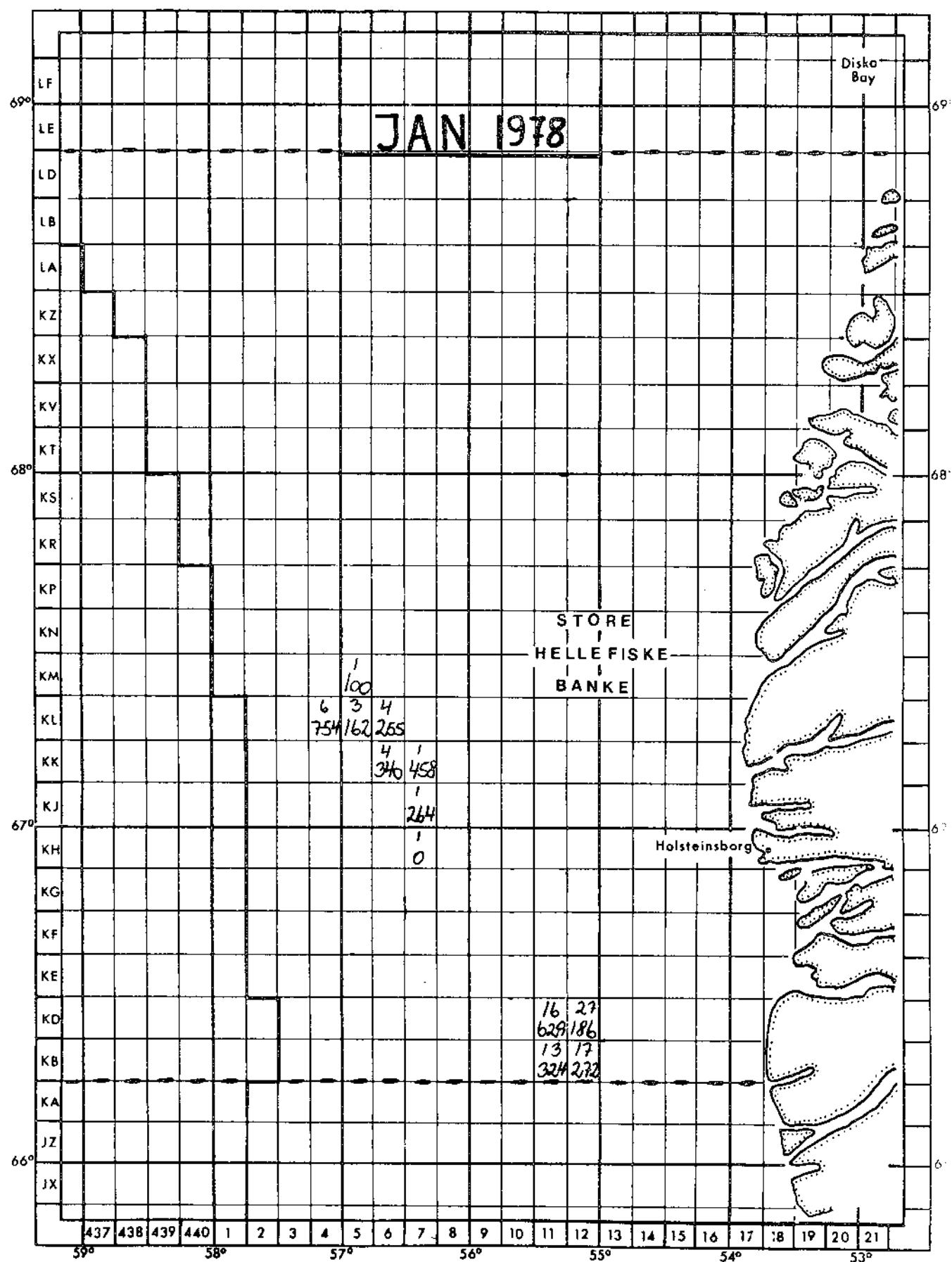


Fig. 6a. Distribution of effort and mean catch per hour in January 1978 in NAF0 Subarea 1 between 65:50'N and 69:10'N at the West coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls; lower figure is the mean catch per hour (kg/hour).

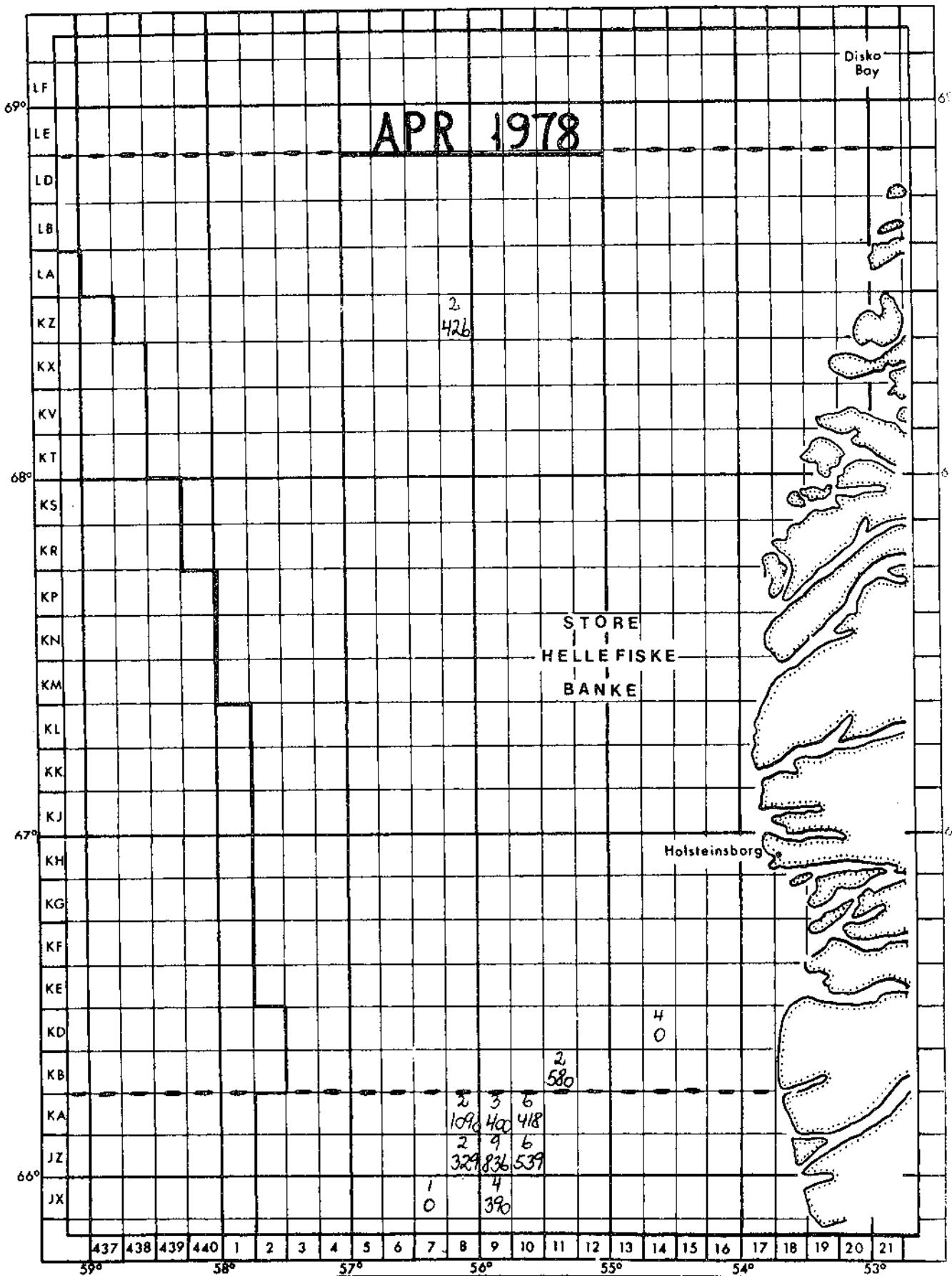


Fig. 6 b. Distribution of effort and mean catch per hour in April 1978 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls; lower figure is the mean catch per hour (kg/hour).

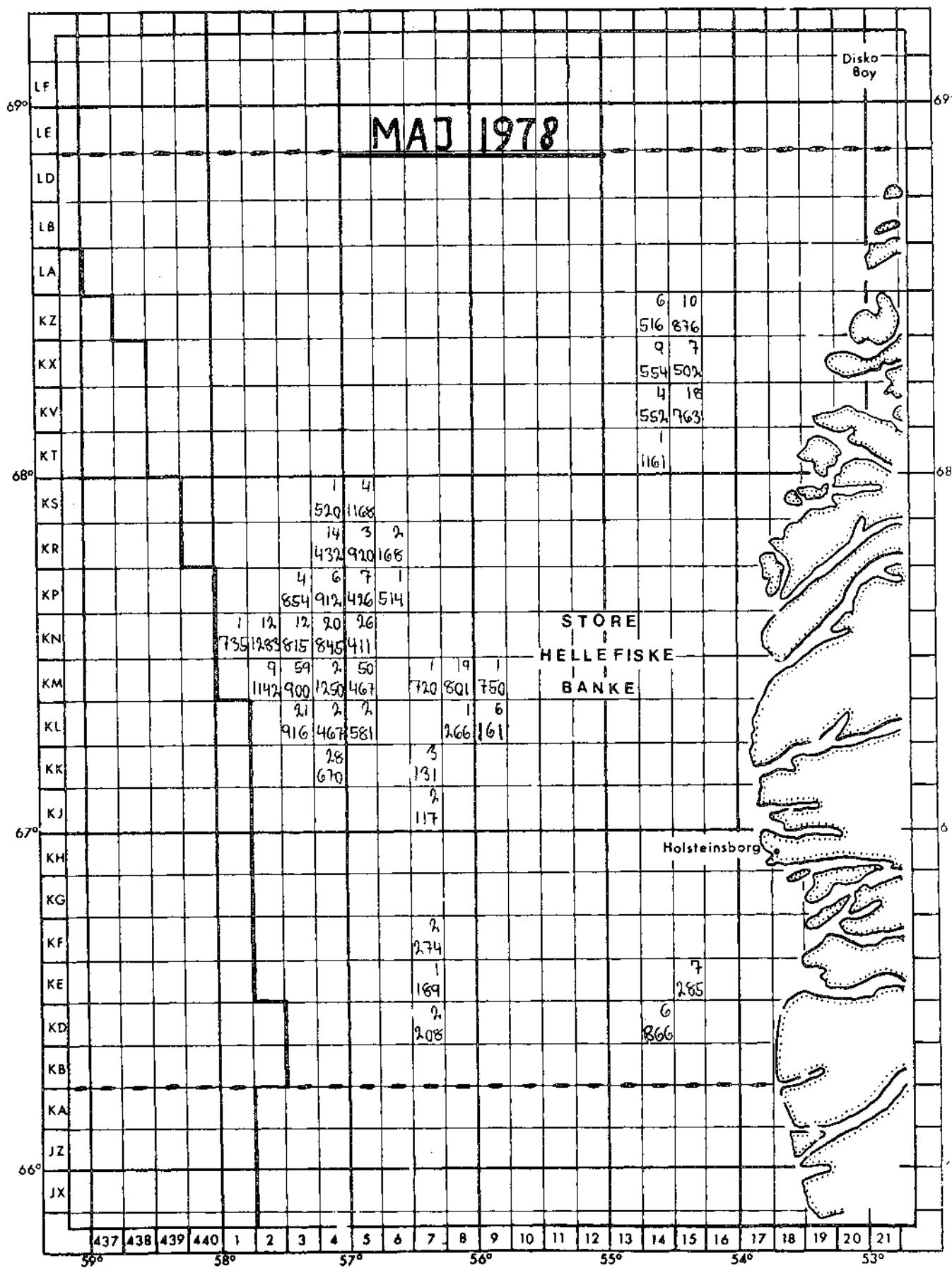


Fig. 6c. Distribution of effort and mean catch per hour in May 1978 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

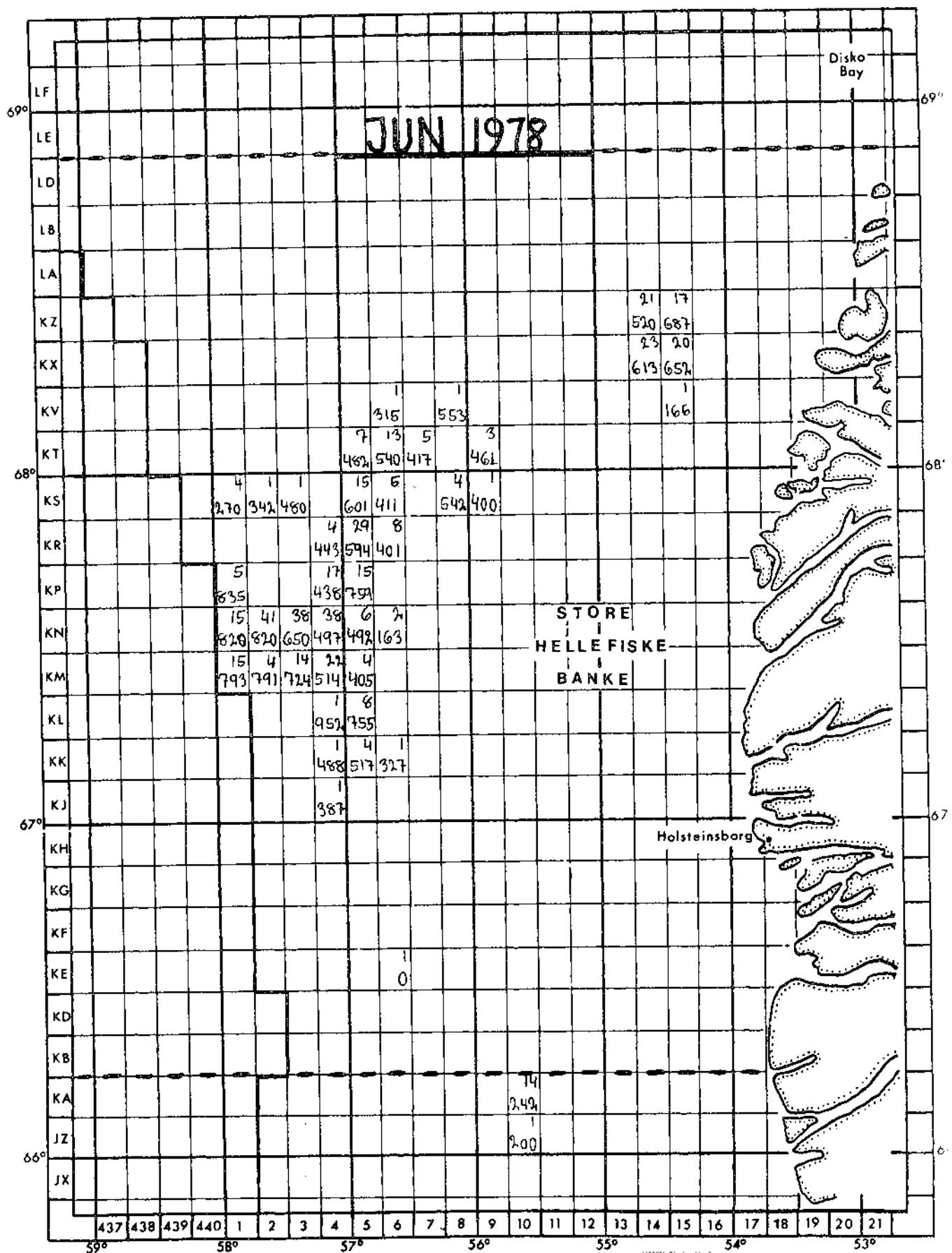


Fig. 6d. Distribution of effort and mean catch per hour in June 1978 in NAFO Subarea 1 between 65°50'N and 69°10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

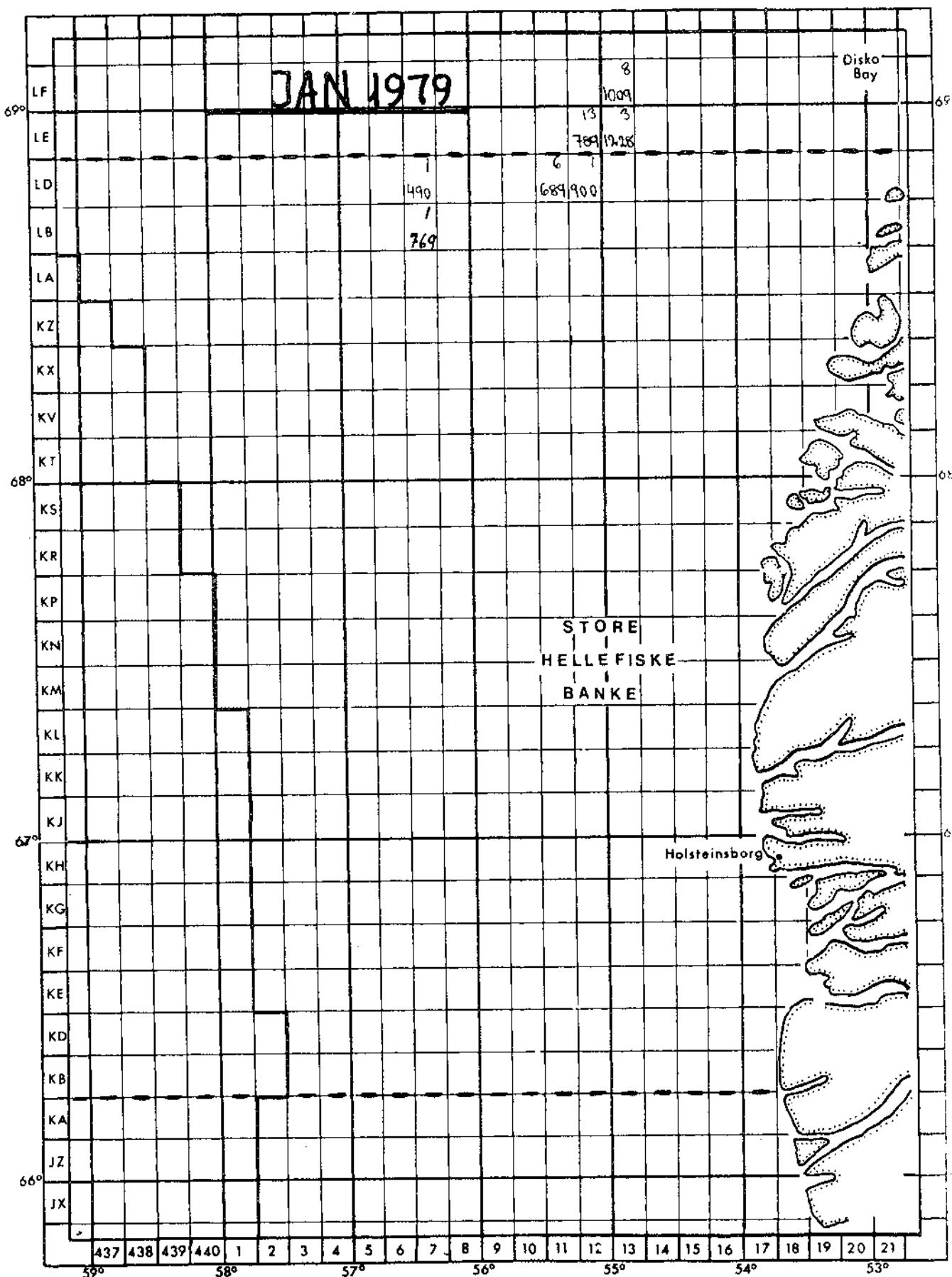


Fig. 7a. Distribution of effort and mean catch per hour in January 1979 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

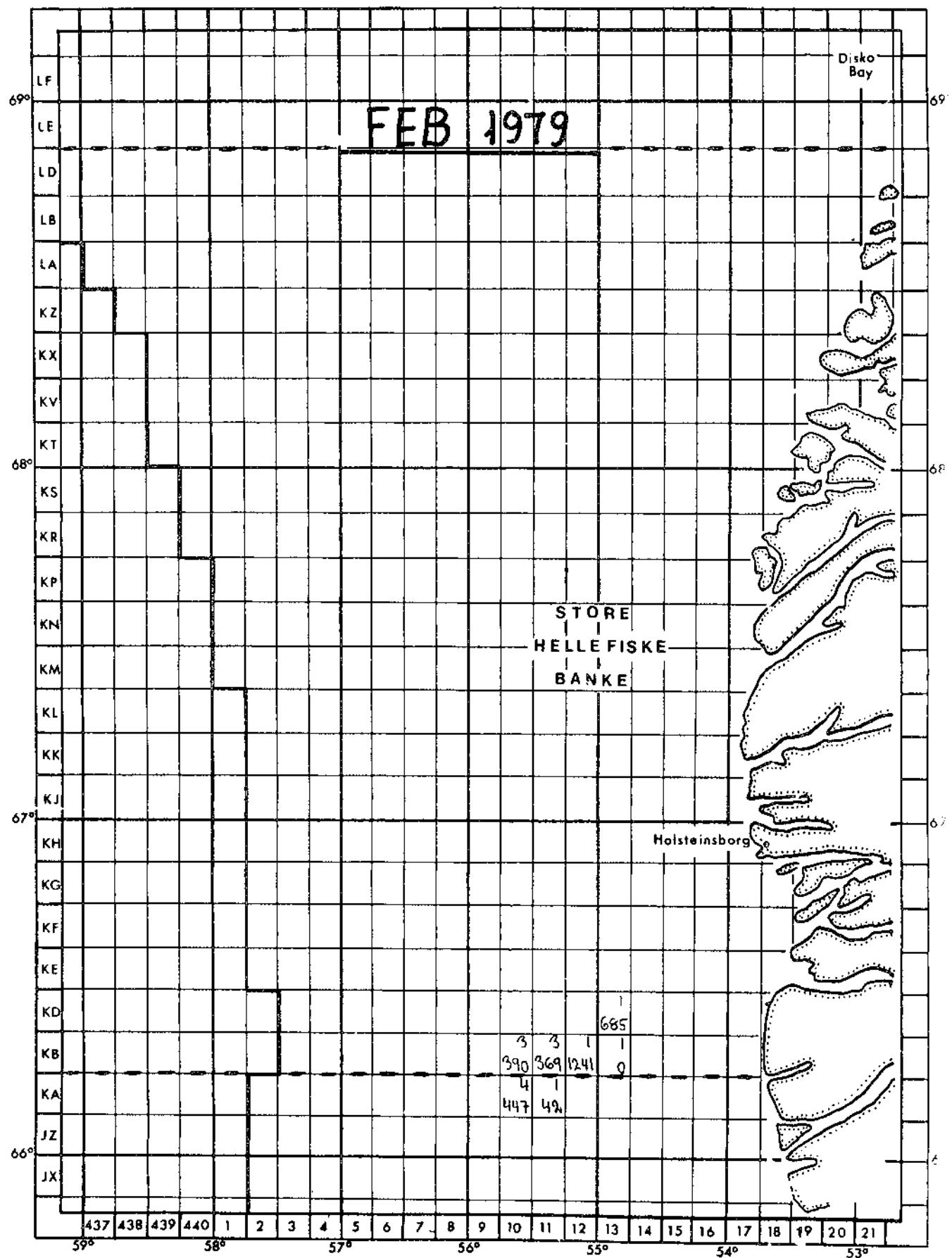


Fig. 7b. Distribution of effort and mean catch per hour in February 1979 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

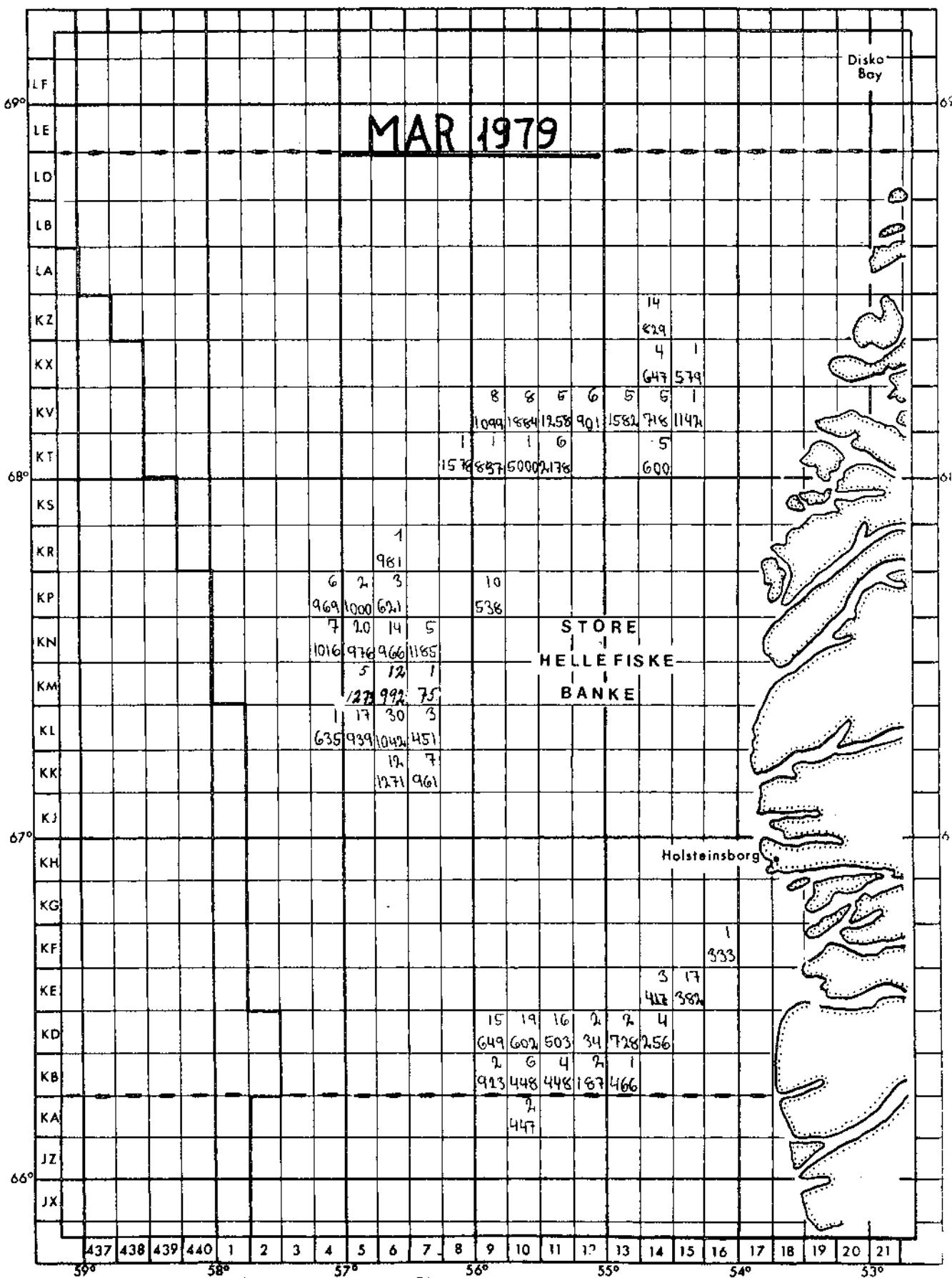
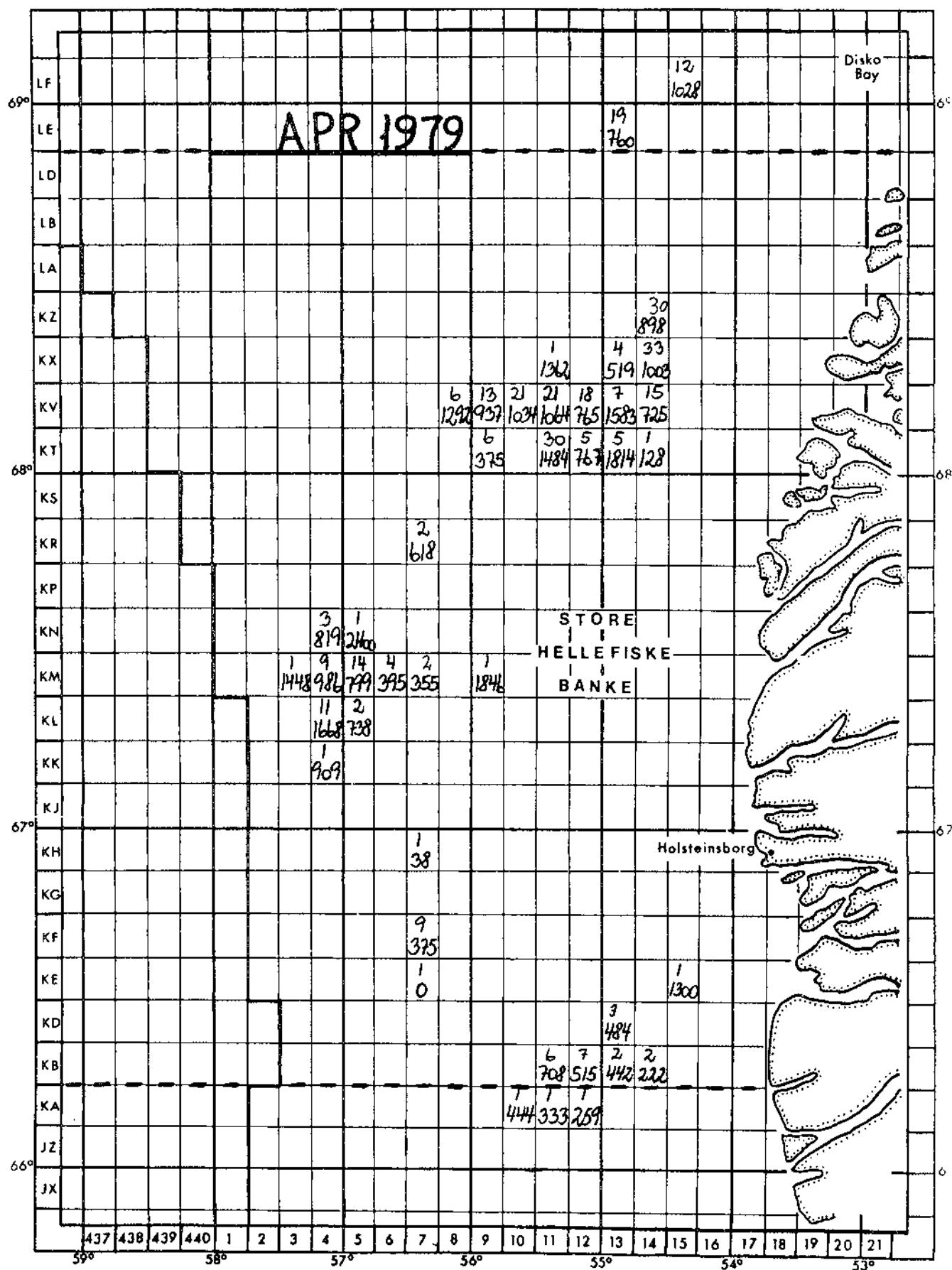


Fig. 7c. Distribution of effort and mean catch per hour in March 1979 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GPT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls; lower figure is the mean catch per hour (kg/hour).



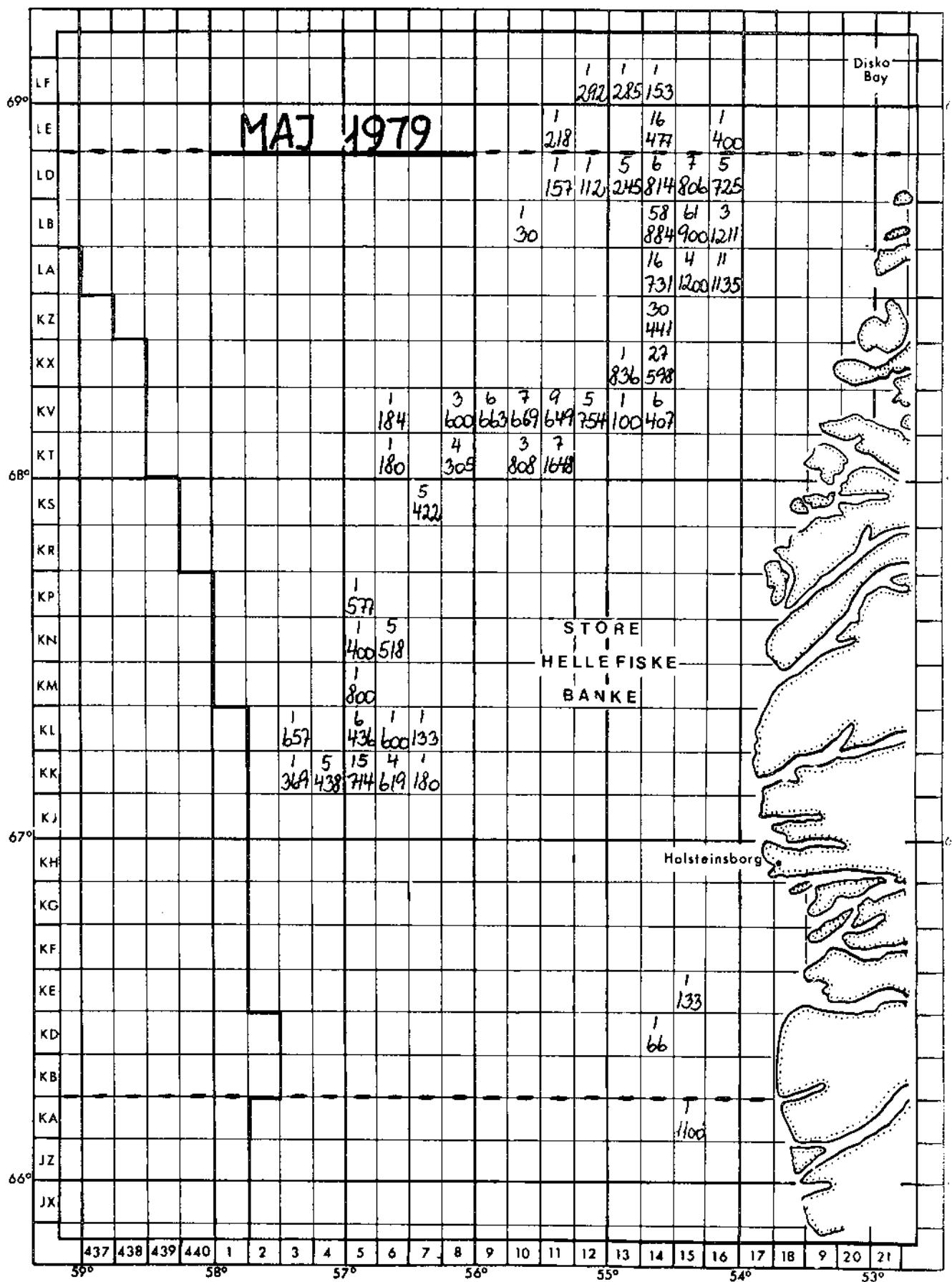


Fig. 7e. Distribution of effort and mean catch per hour in May 1979 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls; lower figure is the mean catch per hour (kg/hour).

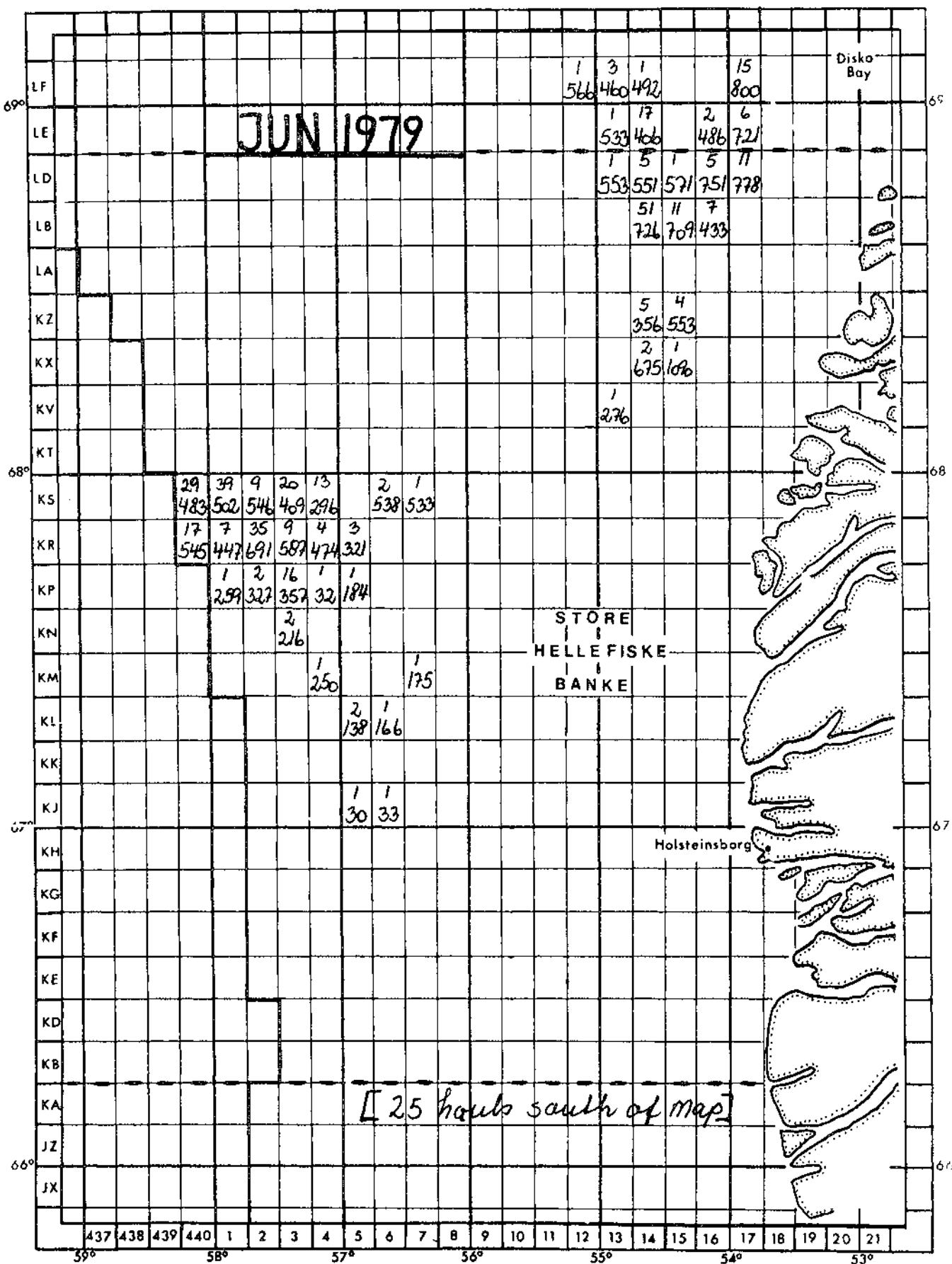


Fig. 7f. Distribution of effort and mean catch per hour in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

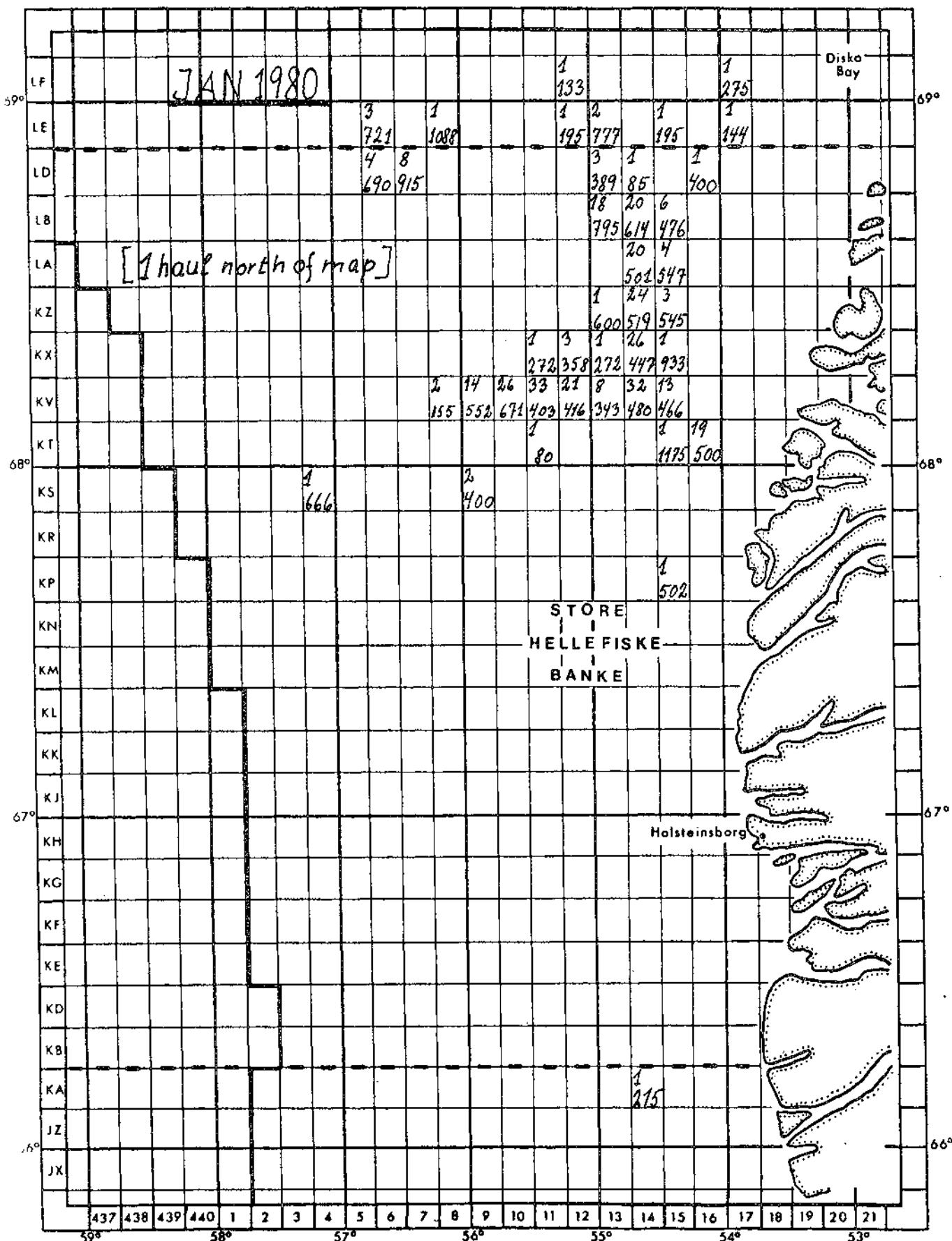


Fig. 8a. Distribution of effort and mean catch per hour in January 1980 in NAFO Subarea I between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

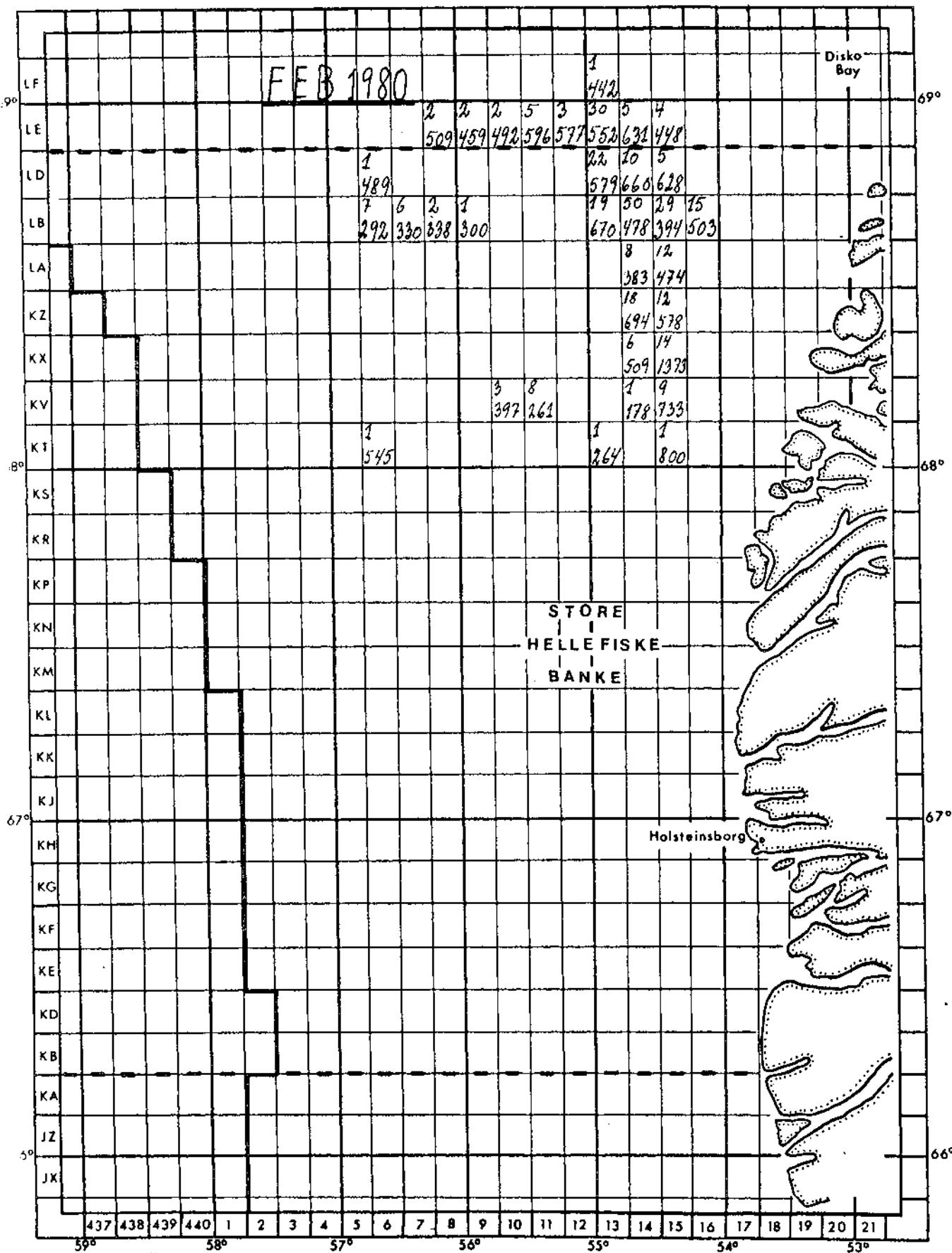


Fig. 8b. Distribution of effort and mean catch per hour in February 1980 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

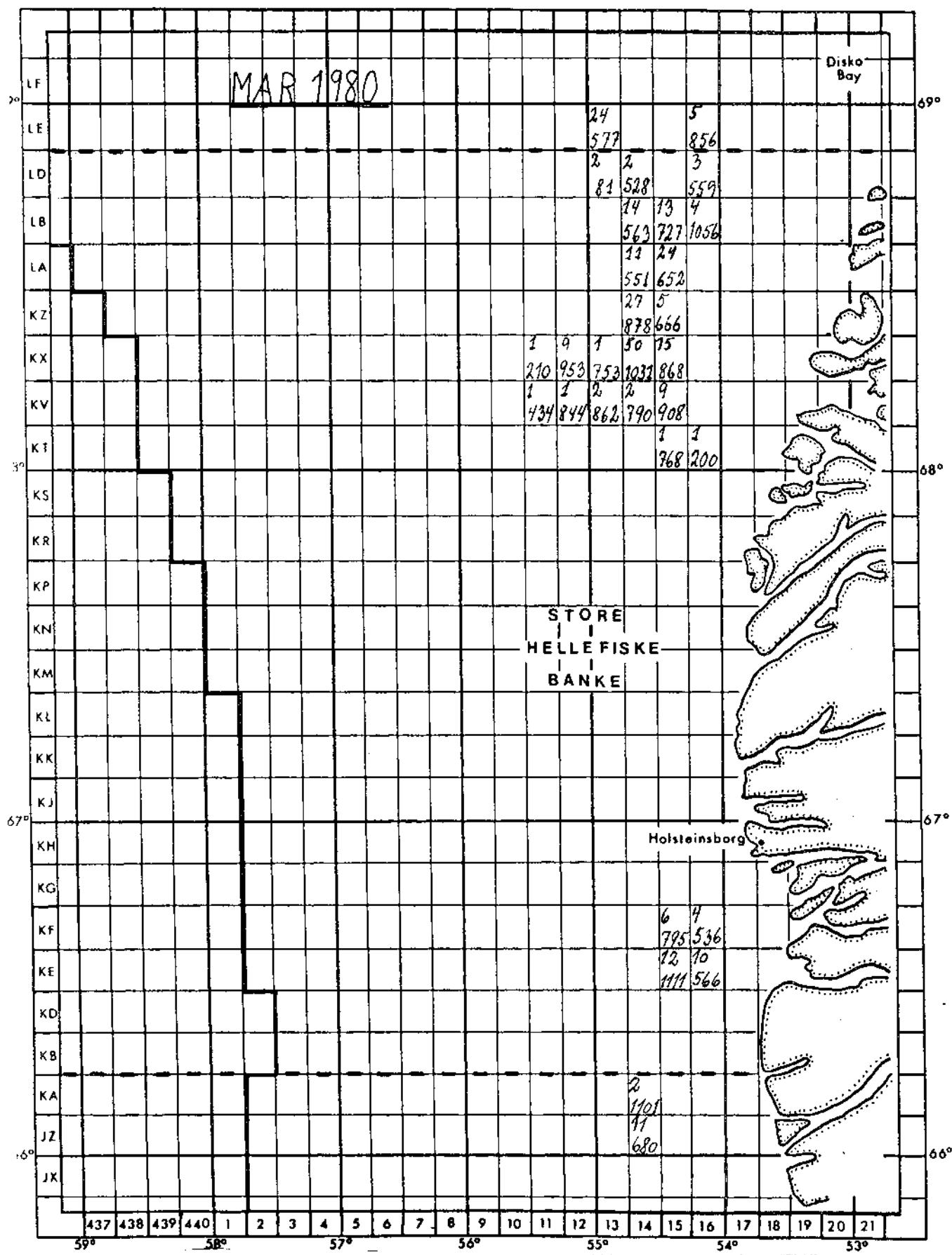


Fig. 8c. Distribution of effort and mean catch per hour in March 1980 in NATO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

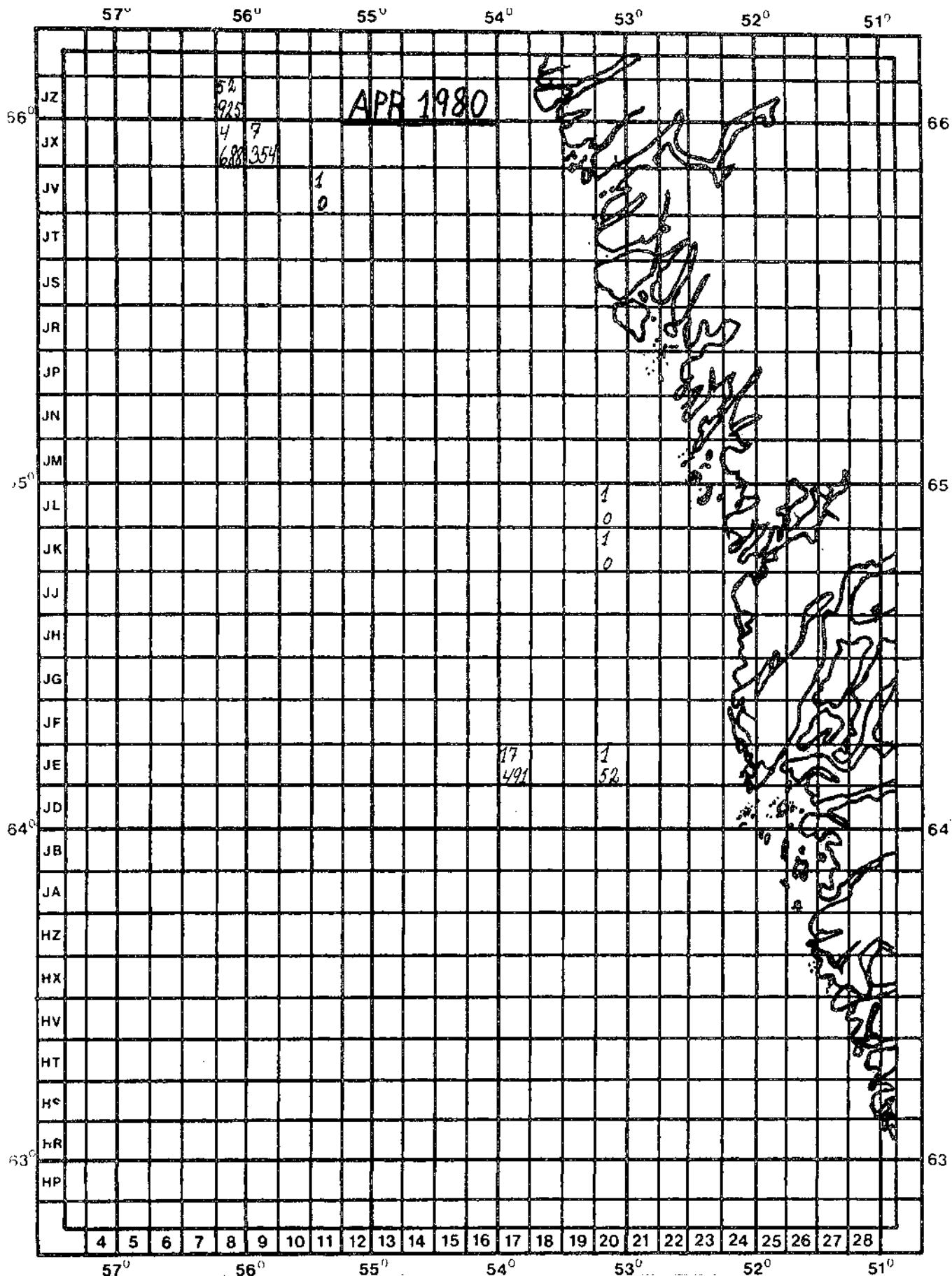


Fig. 8d. Distribution of effort and mean catch per hour in April 1980 in NAFO Subarea 1 between 62:50'N and 66:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls; lower figure is the mean catch per hour (kg/hour).

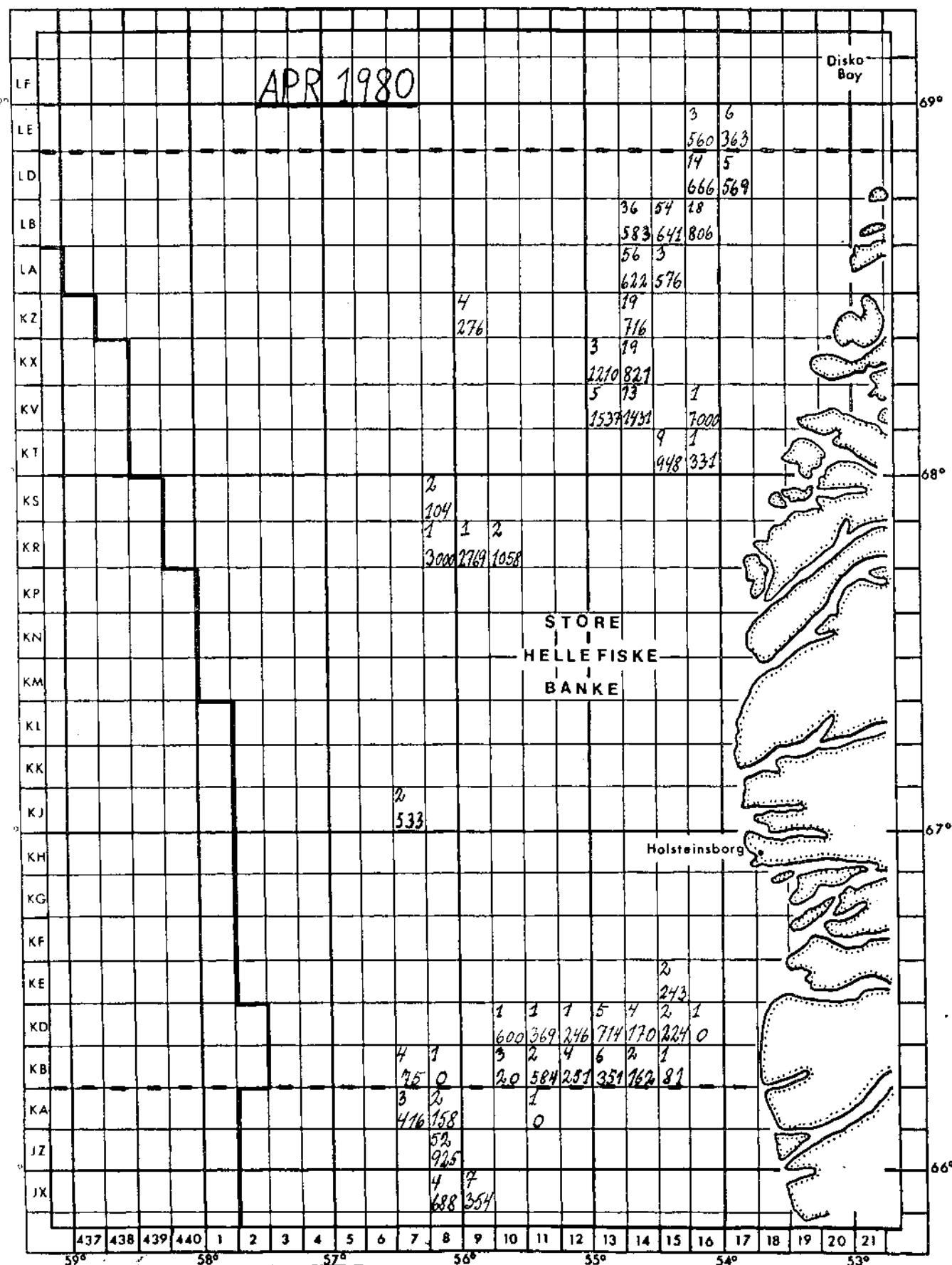


Fig. 8e. Distribution of effort and mean catch per hour in April 1980 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

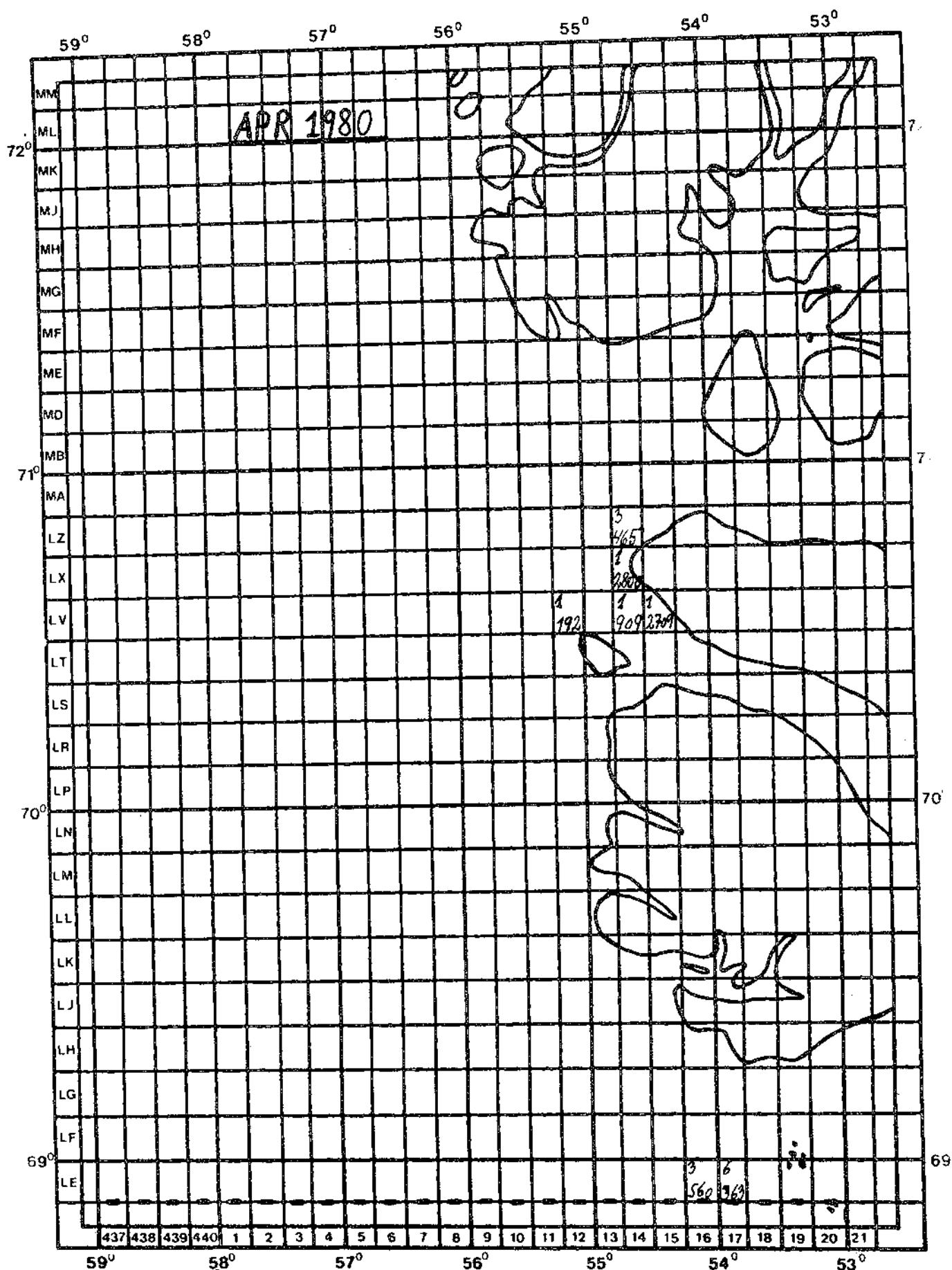


Fig. 8f. Distribution of effort and mean catch per hour in April 1980 in NAFO Subarea 1 between 68°50'N and 72°10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

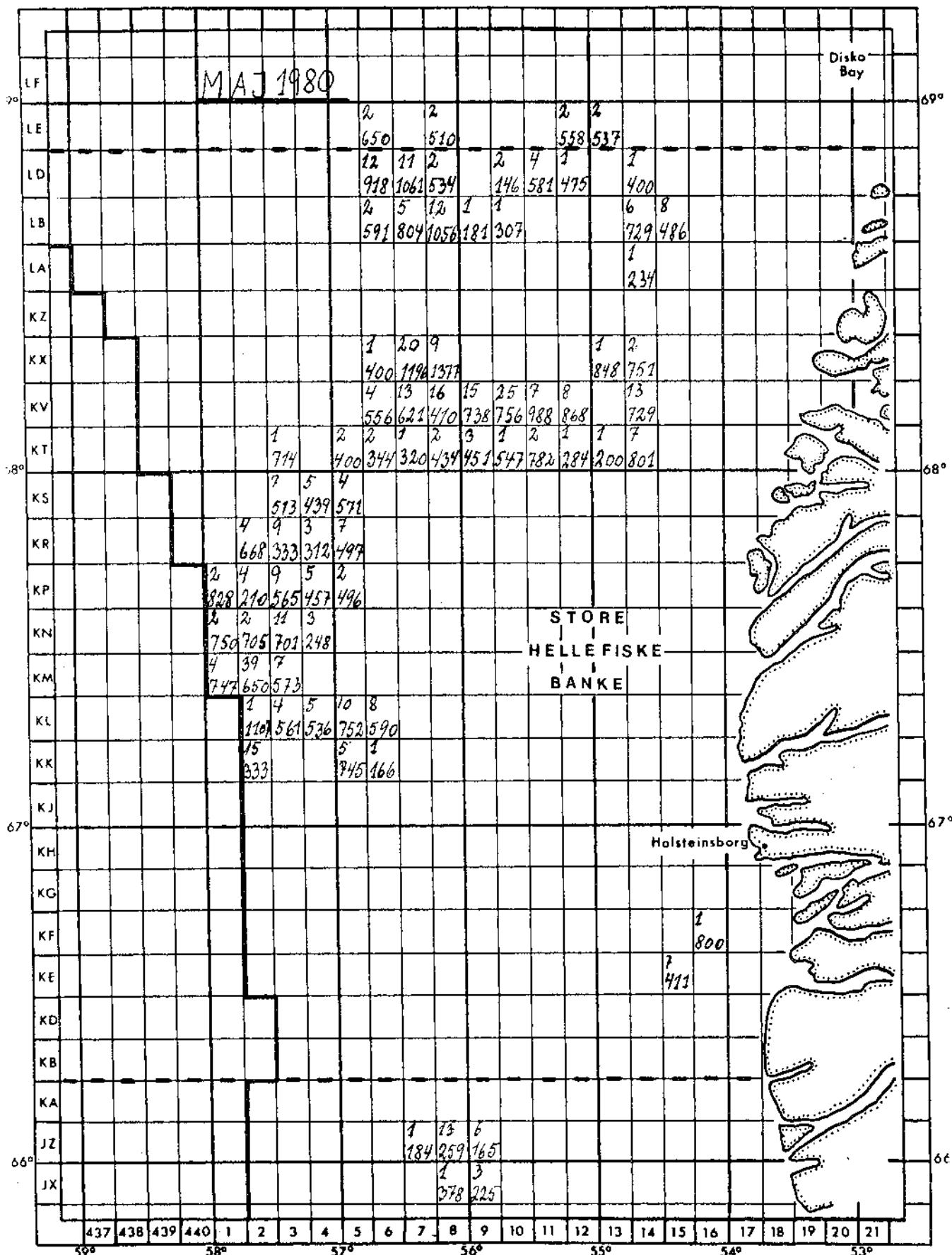


Fig. 8g. Distribution of effort and mean catch per hour in May 1980 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

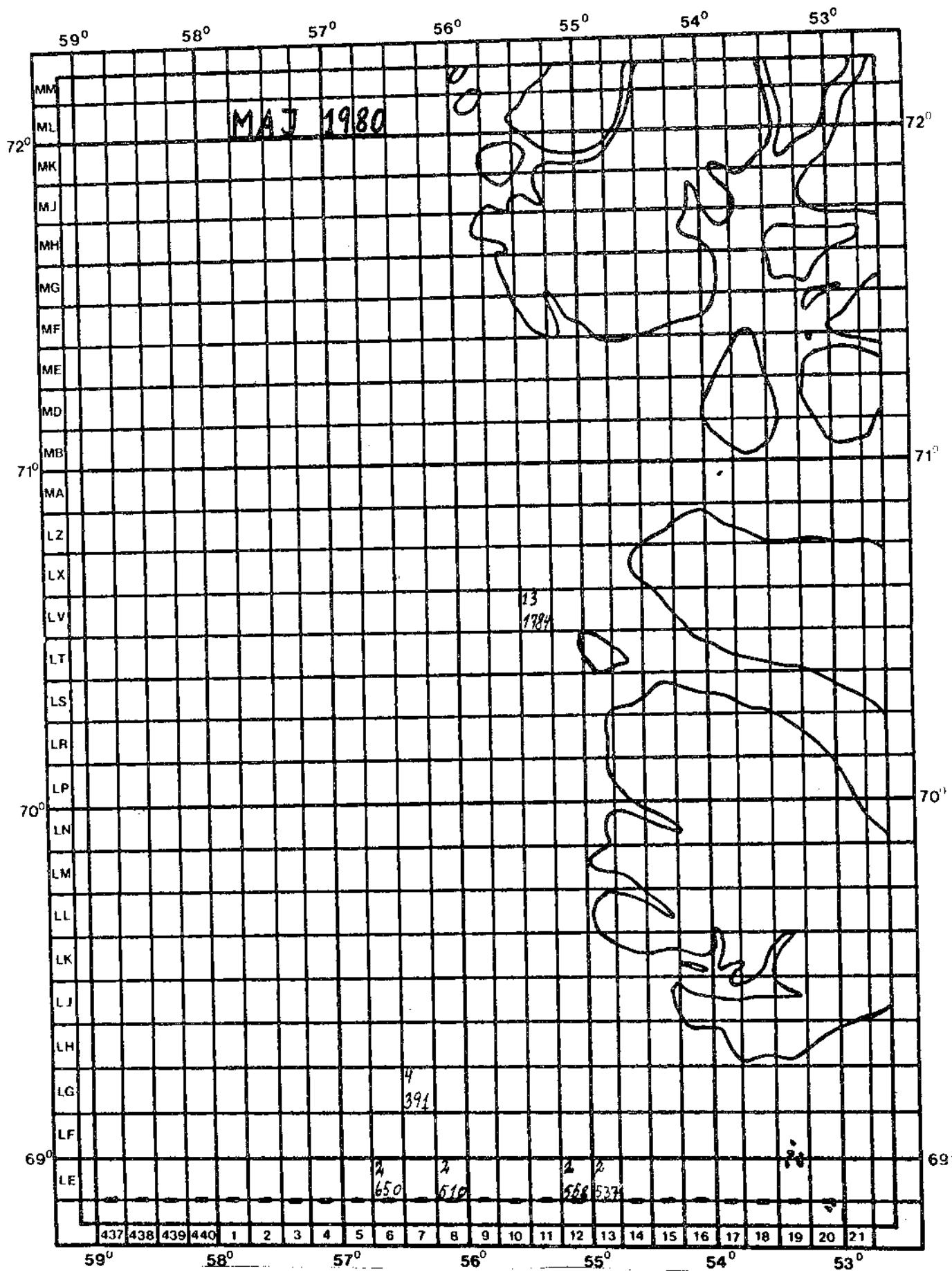


Fig. 8h Distribution of effort and mean catch per hour in May 1980 in NAFO Subarea 1 between 68:50'N and 72:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

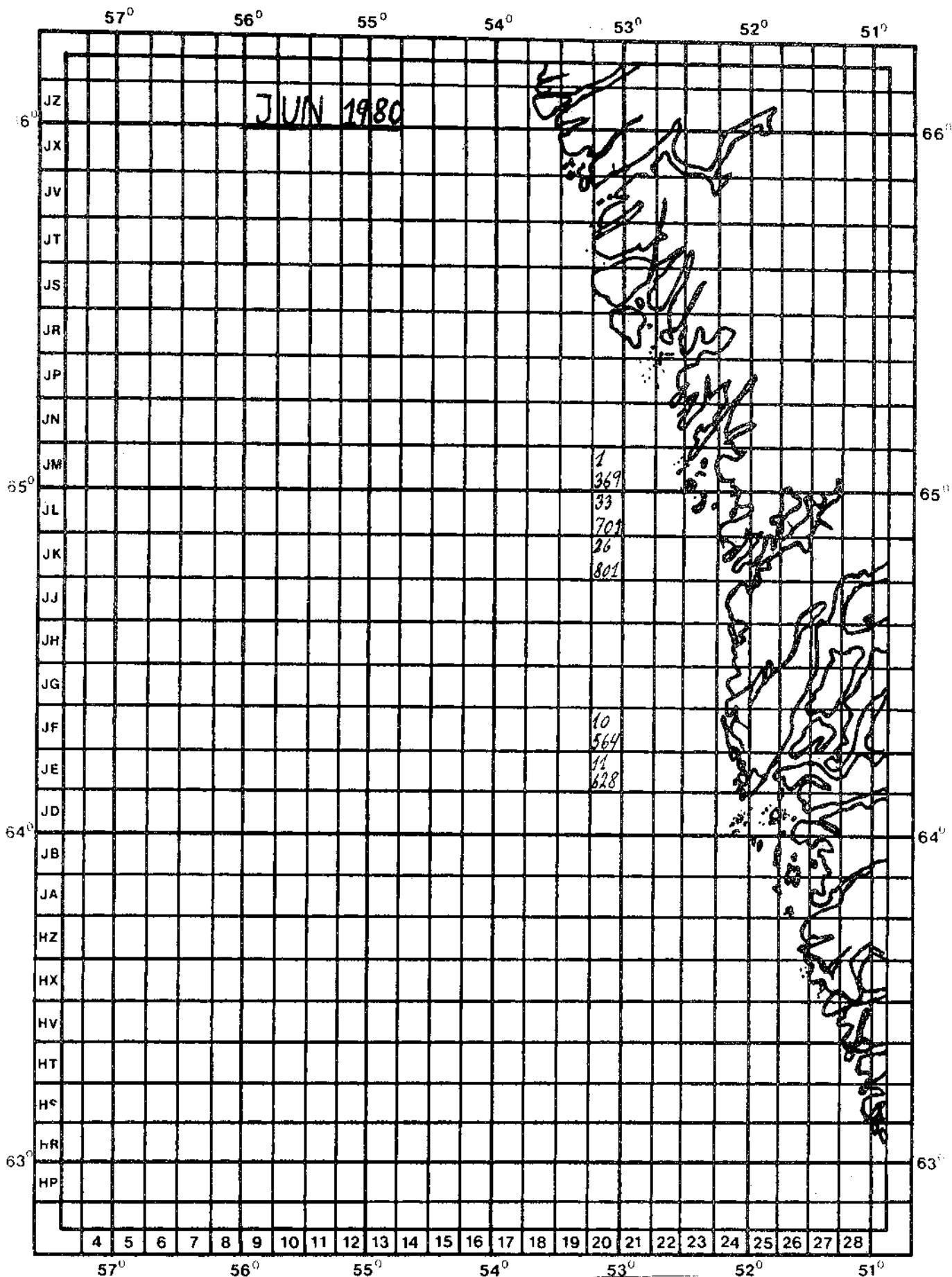


Fig. 8c. Distribution of effort and mean catch per hour in June 1980 in NAFO Subarea 1 between 62:50'N and 66:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

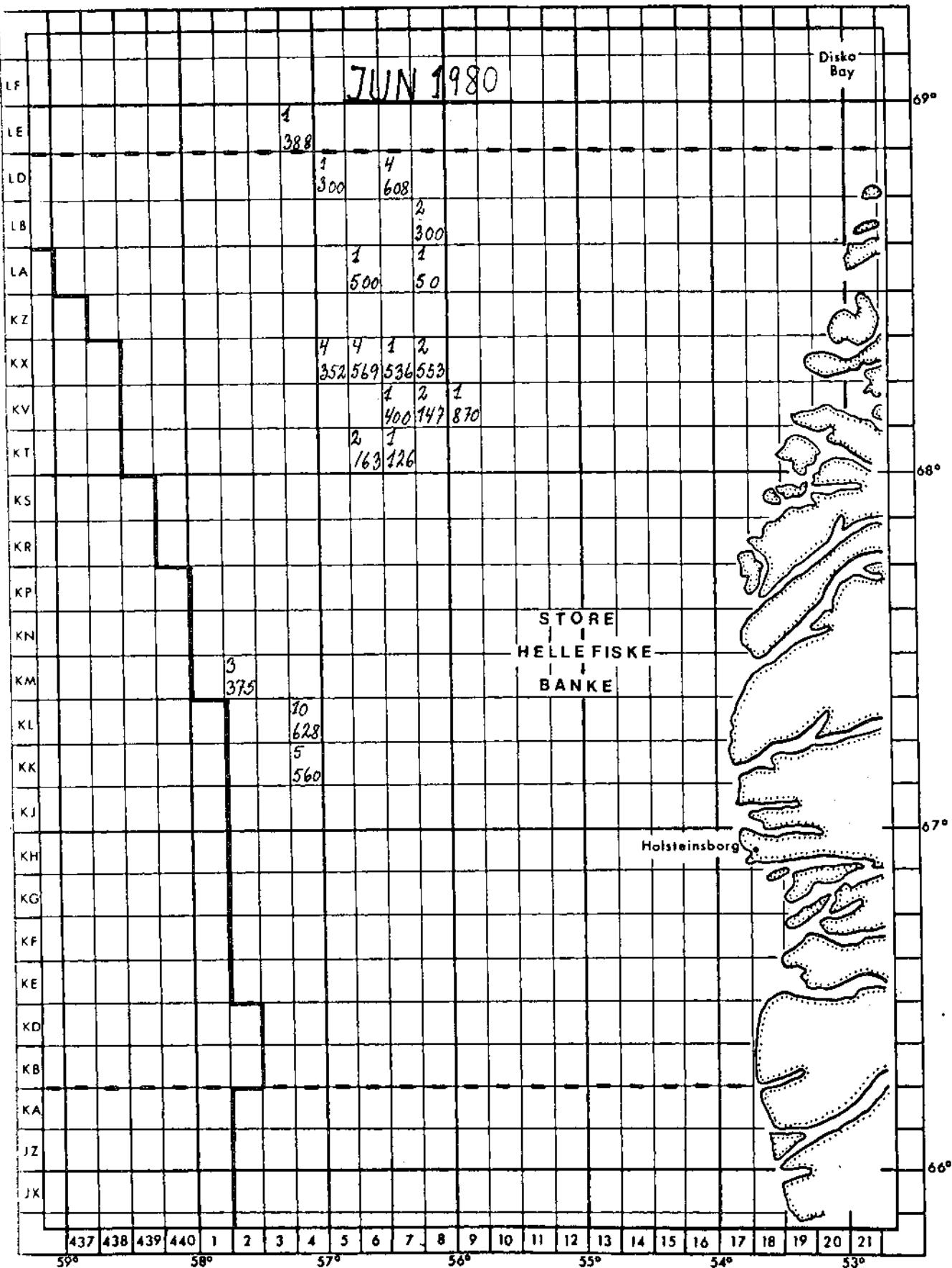


Fig. 8j. Distribution of effort and mean catch per hour in June 1980 in NAFO Subarea 1 between 65:50'N and 69:10'N at the west coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).

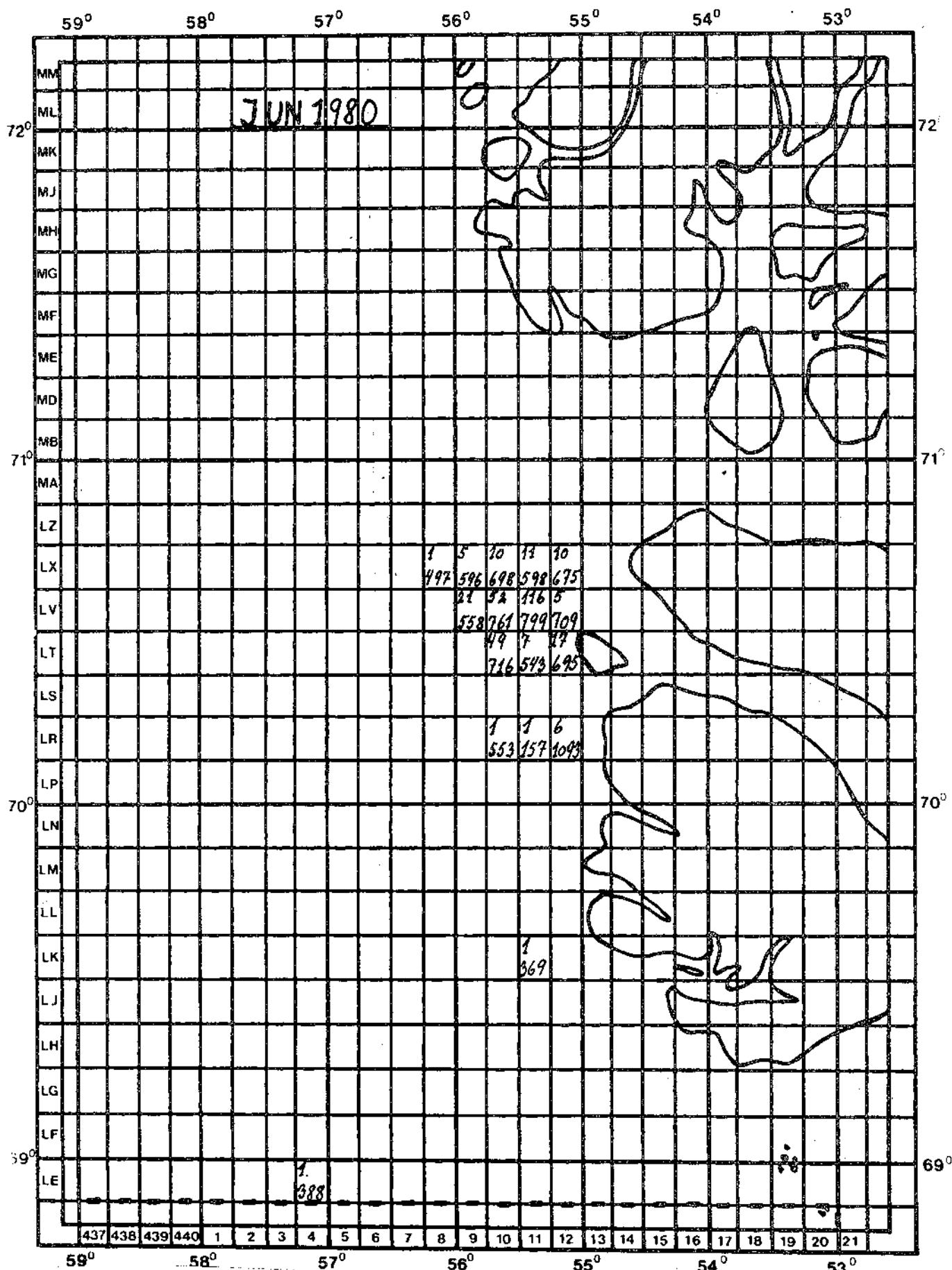


Fig. 8k. Distribution of effort and mean catch per hour in June 1980 in NARO Subarea 1 between 68:50'N and 72:10'N at the West coast of Greenland by six trawlers (722 GRT) of the Royal Greenland Trade Department. Upper figure in each statistical square unit is no. of hauls, lower figure is the mean catch per hour (kg/hour).