Northwest Atlantic Fisheries Organization

Serial No. N1615

NAFO SCR Doc. 89/38

SCIENTIFIC COUNCIL MEETING - JUNE 1989

Greenland Fishery for Shrimp (Pandalus borealis Kr.) in NAFO Division 1A, (Greenland Management Areas NV1 and NV2) in 1988

by

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INTRODUCTION.

Since 1985 Greenland trawlers have fished for shrimp in the West Greenland offshore area north of 70°52,5'N. During 1985 and 1986 this area was considered an experimental area not included in the commercial shrimp fishing areas for which advice on total quota regulation was given by STACFIS.

Nominal catches were 4.349 tons in 1985 and 11.045 tons in 1986.

In 1987 Greenland authorities changed the southern limit of the area to 71°N and set a TAC of 11,500 tons for the area from 71°N to 72°52,5'N (NAFO Div. 1A NV1). Fishery in the area north of 72°52,5'N (NAFO Div. 1A NV2) was still considered a trial fishery, though.

For 1988 the Greenland Home Rule Administration fixed a TAC at 11,500 tons for the area between 71o00'N and 72o52.5'N (NAFO Div. 1A NV1). Nominal catches were 10,626 tons in NAFo Div. 1A NV1 and NV2 in 1987 and 6,660 tons in 1988.

STACFIS gave no advice for a TAC for the area north of 71°N in 1987 and 1988, but suggested in 1988 that a cautious approach to the exploitation of this shrimp stock be taken.

For 1989 Greenland authorities set a TAC of 8,000 tons for the area from 71°N to 72°52,5'N.

MATERIALS AND METHODS.

Total catches and numbers of vessels participating in the fishery north of 71°00'N were compiled by area and year on the basis of compulsory reportings by all vessels to Greenland authorities.

Logbook data from 30 trawlers were analysed to show the overall distribution of trawling hours and mean catch rates in 1988.

RESULTS.

On the basis of distribution of effort in 1986 five fishing grounds, located within the statistical squares mentioned below, were discerned (Lund 1988). Only statistical squares which were visited by more trawlers and in which total effort was 100 hours or above in 1986 were included in the original definition, but since 1986 more statistical squares have been regarded as including the fishing grounds.

Fishing ground	Statistical squares
UUMMANNAQ	MB004-010;
SVARTEN HUK	MG007;
SØNDRE UPERNAVIK	ML003-006,
	MM001-004, MM438-440,
	MN002-005, MN438,
	MP005-006;
UPERNAVIK	MT004;
TUGTORQORTOQ	ND438;

Fishery took place from June to December; meteorological observations indicate that the major fishing areas were ice-free during this period.

Total effort, as registered by Greenland Fisheries Research Institute, was 29,462 hours of trawling (abt. 3/4 of the effort in 1987).

Excepting three hours of fishing in statistical unit MV003, Greenland Fisheries Reasearch Institute has registered no fishery in the experimental area north of 72°52,5'N; i.e. no fishing effort was expended in the northernmost fishing ground, **Tugtorqortoq**.

In NAFO Div. 1A NV1 more than 99% of the total effort was expended in statistical squares in which fishery had taken place in the previous years. Fishing effort in the two smallest fishing grounds in NAFO Div. 1A NV1, **Svarten Huk** and Upernavik, comprised less than 1% of the total fishing effort.

The fishery in the strips covering Søndre Upernavik and Umanak fishing grounds (MB, ML, MN, MM, and MP) accounts for 90% of the total effort in 1988. In 1987 and 1986 the corresponding percentages were 82 and 58.

Greatest effort was expended in **Umanak** fishing area. Compared to the fishery in 1986 and 1987, the relative significance of this fishing area, as measured by fishing effort, showed an increase. In 1986 and 1987 the effort at Umanak made up 22 and 38 percent of the total effort, while in 1988 the corresponding figure was 50%. In terms of absolute figures, fishing effort in Umanak fishing ground doubled from 1986 to 1987, while from 1987 to 1988 there was little change.

DISCUSSION AND CONCLUSION

The distribution of total fishing effort in the North-West Greenland offshore fishing area has changed during the last three years, although the overall pattern of distribution in 1986 is still easily recognizable in the pattern of 1988 (figs. 1a-1g).

Starting in the fall of 1986, when the whole fleet moved to Umanak fishing ground, the displacement of effort in a southerly direction and the concentration of effort in localized areas continued in 1987 and reached a peak in 1988, when no fishing took place north of 73°N.

Only in 1986, when the majority of trawlers were obliged to fish north of 72°52,5'N, did a fishery of any significance occur in this area, and even then, fishery was limited to a period of three months (August-September). About 17% of the total effort was spent north of 72°52,5'N in 1986. In 1987 this figure was reduced to less than 3% percent and in 1988 no fishery, as registered by Greenland Fisheries Reseach Institute, occurred north of 72°52,5'N.

The two smallest fishing grounds, Tugtorqortoq (statistical unit ND438) and Svarten Huk (s.u. MG007), which two years of fishing have shown to be of low yield, have been abandoned. ND438 because of its distant location and the low catch rates of less than 150 kg/hour experienced during 1987, and MG007 most probably because of the composition of catches (as stated by fishermen - and shown by shrimp samples - the area around MG007 is characterized by a seemingly lack of female shrimp and a dominance of small male shrimp).

The tendency to concentrate the effort on Søndre Upernavik and Umanak fishing grounds was more pronounced in 1988 than in the previous years, as only about 10% of the total effort in 1988 was expended outside these areas. Concomitantly with this concentration of effort, the distribution of effort on Søndre Upernavik and Umanak fishing grounds has changed. Common to the fishery on both grounds is a more easterly distribution of effort in 1988 as compared to the previous years. On both fishing grounds trawling activity tended to be highest in deeper water near the territorial sea base line. This resulted in a displacement of the centre of activity in a north-easterly direction on Søndre Upernavik fishing ground, while at Umanak the displacement was due east (figs. 2a-2g).

Concurrently with these changes of fishing pattern, mean cpue values obtained on the large fishing grounds have shown a decline since 1986 (figs. 3a and 3b). When new areas have been added to the established fishing grounds, high monthly mean catch rates have often been obtained during the initial period of fishing by more boats, after which catch rates have declined. During the first month of fishing (September) in the north- eastern 'corner' of Søndre Upernavik (s.u. MP006) in 1987 a mean cath rate of more than 600 kg/hour was obtained (182 hours of fishing). However, through 1987 mean catch rates declined steadily to a abt. 200 kg/hour, and monthly means of less than 300 kg/hour were characteristic of the fishery in MP006 in 1988.

This cycle of fishery during which good catches are made by many boats in a localized area and following which catches decline drastically, has been demonstrated in more statistical squares during the last three years of fishing in NAFO Div. 1A NV1 and NV2 (figs. 1a-1f, 3a-b). This implies that immigration of shrimp from areas outside the fishing grounds happens at a low rate relative to the rate of removal of shrimp by fishing.

Preliminary results of a stratified-random trawl survey carried out by Greenland Fisheries Research Institute in 1988 indicate that biomasses of shrimp are low in NAFO DIV. 1A NV1 (Carlsson D.M. & P.Kanneworff, 1989. Report on a stratified-random trawl survey for shrimp (Pandalus borealis) in NAFO Subarea 0+1 in July 1988. SCR Doc. 89/). Densities appear to be particularly low in the wast areas surrounding the major fishing grounds, and these areas are probably of little value as 'supply areas' to the fishing grounds, as replenishment of the trawlable biomass will occur at a very low rate.

References.

Lund, H. (1988): Greenland Fishery for Shrimp (Pandalus borealis Kr.) in NAFO Division 1A, (Greenland Management Areas NV1 and NV2) in 1986 and 1987. NAFO SCR Doc. 88/58, Serial No.N1498.

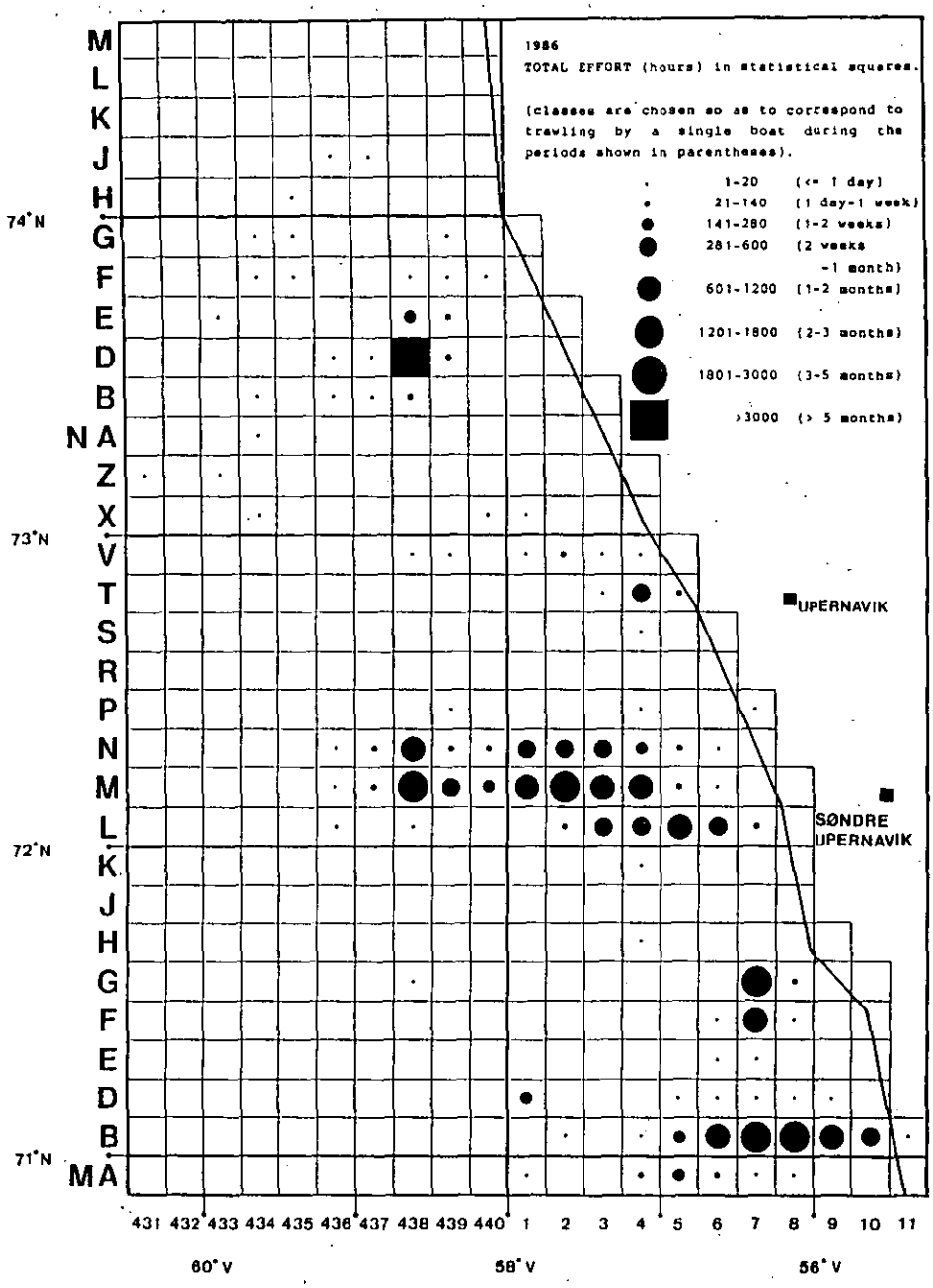

Figure 1a.
Map of the North-West Greenland fishing area (NAFO Div. 1A (Greenland management areas NV1 and NV2)) including statistical squares between the territorial sea base line and 60°30'W south of 74°37.5'N.
Distribution of total effort as registered by Greenland Fisheries Research Institute.

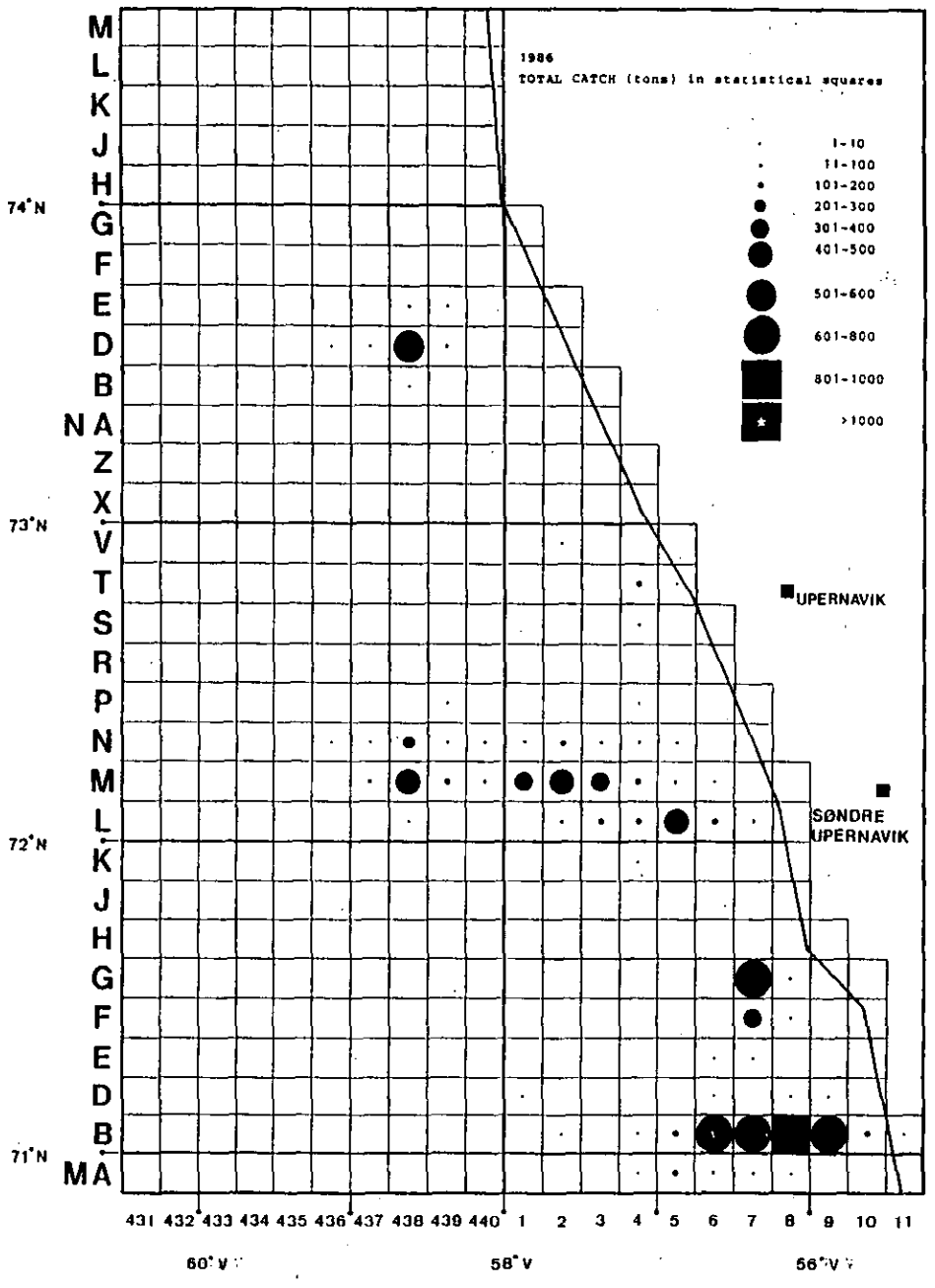

Figure 1b.
Map of the North-West Greenland fishing area (NAFO Div. 1A (Greenland management areas NV1 and NV2)) including statistical squares between the territorial sea base line and 60°30'W south of 74°37.5'N.
Distribution of total catch as registered by Greenland Fisheries Research Institute.

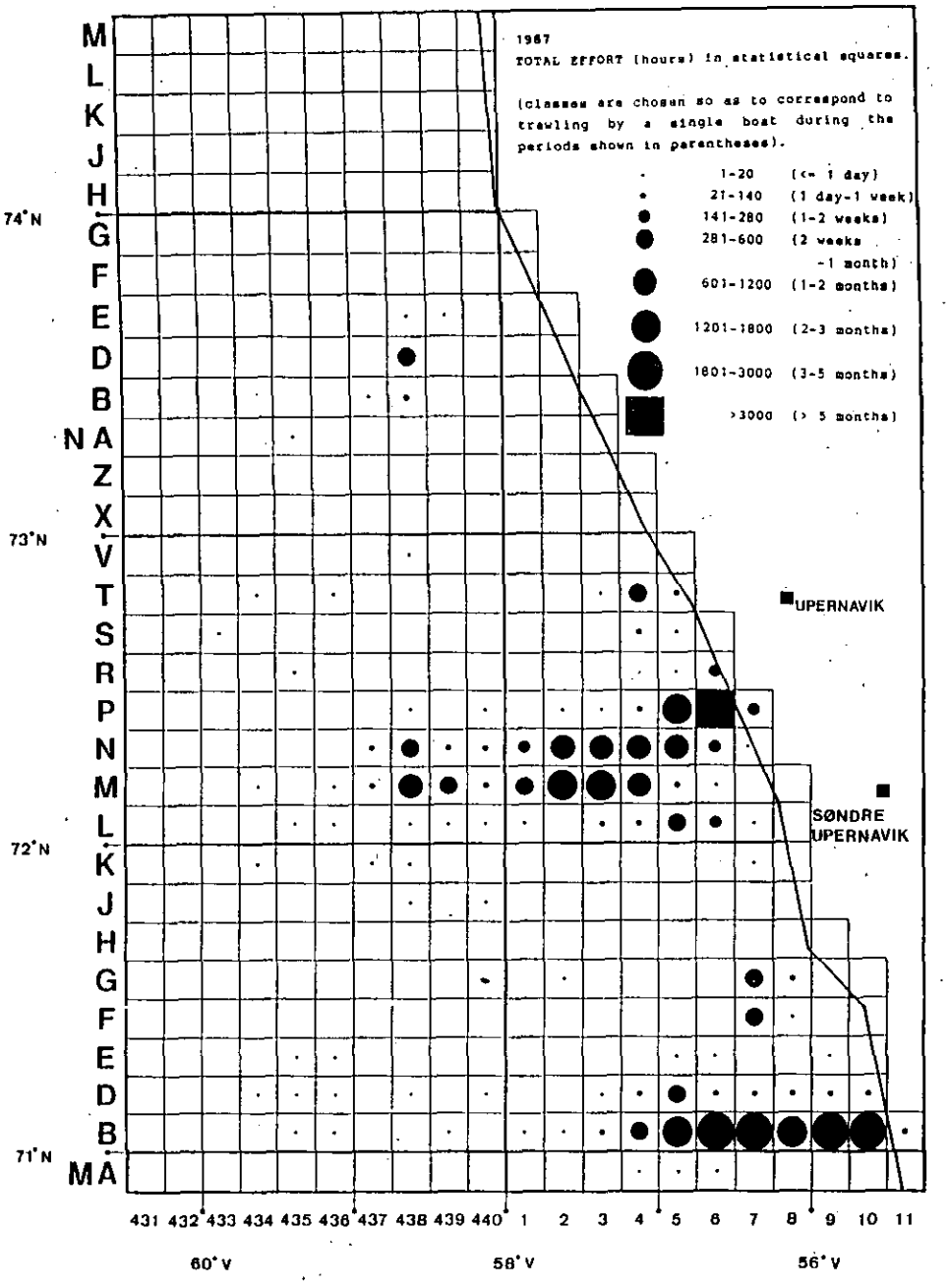

Figure 1c.
Map of the North-West Greenland fishing area (NAFO Div. 1A (Greenland management areas NV1 and NV2)) including statistical squares between the territorial sea base line and 60°30'W south of 74°37.5'N.
Distribution of total effort as registered by Greenland Fisheries Research Institute.

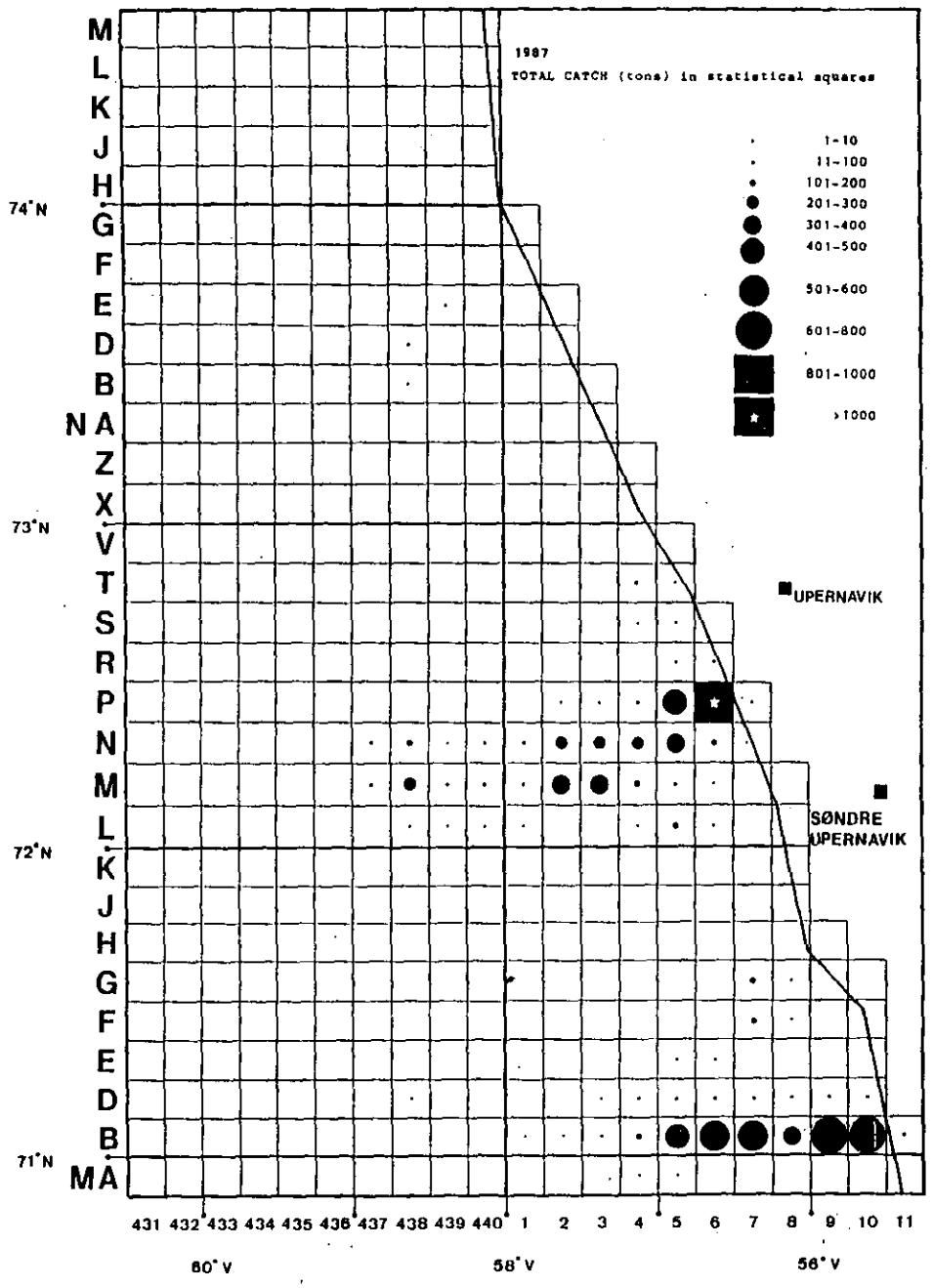

Figure 1d.
Map of the North-West Greenland fishing area (NAFO Div. 1A (Greenland management areas NV1 and NV2)) including statistical squares between the territorial sea base line and 60°30'W south of 74°37.5'N.
Distribution of total catch as registered by Greenland Fisheries Research Institute.

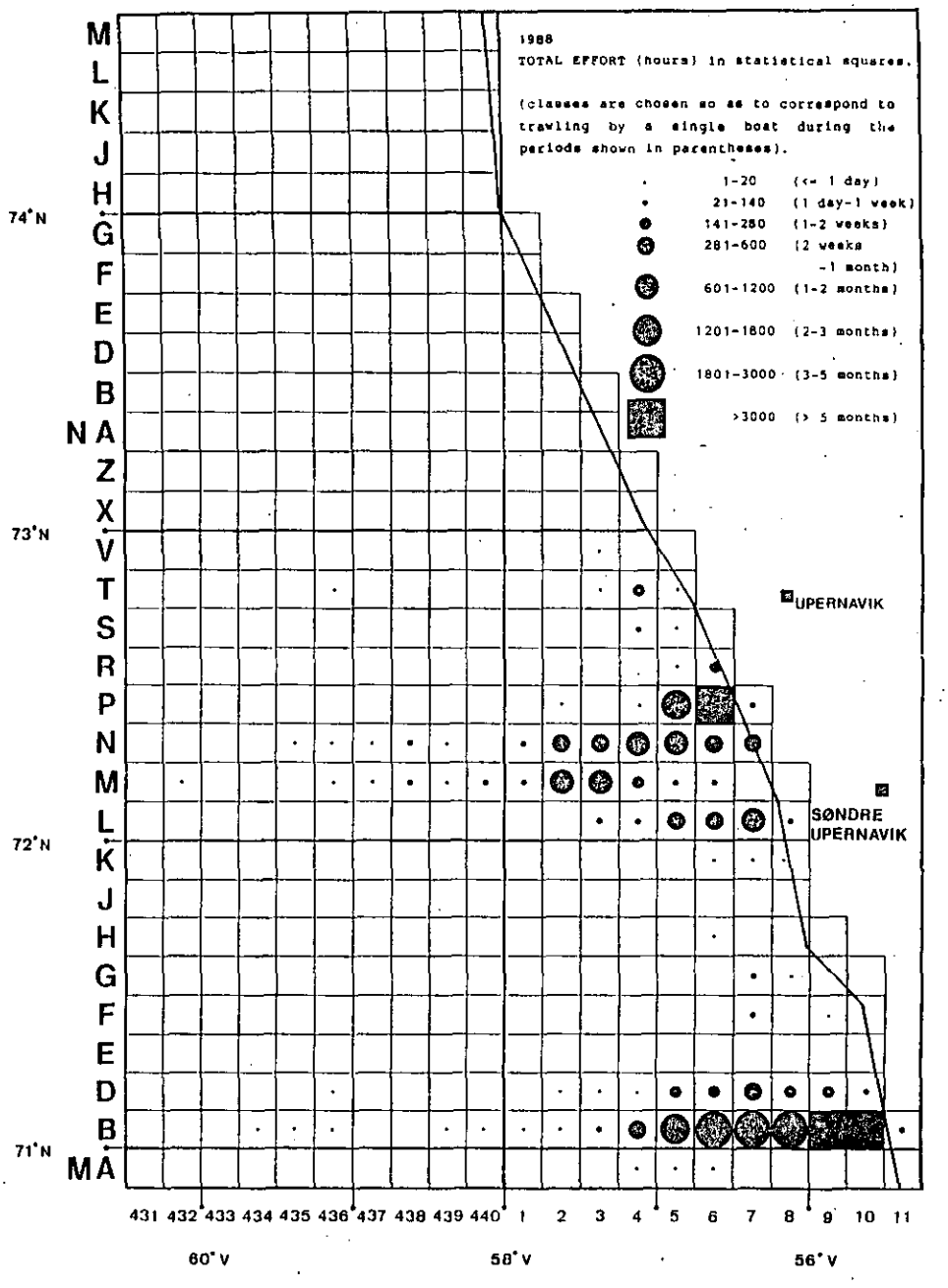

Figure 1e.
Map of the North-West Greenland fishing area (NAFO Div. 1A (Greenland management areas NV1 and NV2)) including statistical squares between the territorial sea base line and 60°30'W south of 74°37.5'N.
Distribution of total effort as registered by Greenland Fisheries Research Institute.

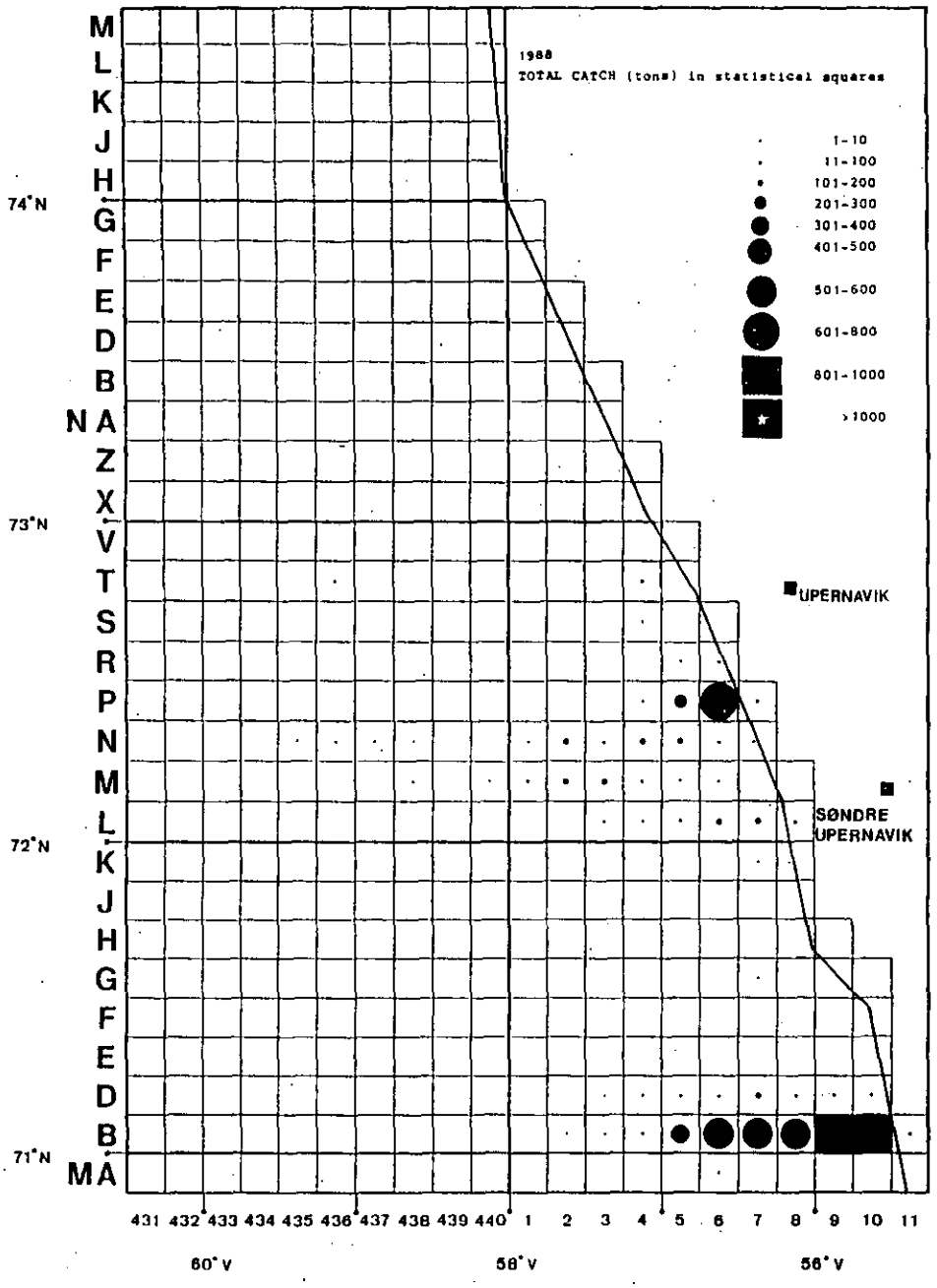

Figure 1f.
Map of the North-West Greenland fishing area (NAFO Div. 1A (Greenland management areas NV1 and NV2)) including statistical squares between the territorial sea base line and 60°30'W south of 74°37.5'N.
Distribution of total catch as registered by Greenland Fisheries Research Institute.

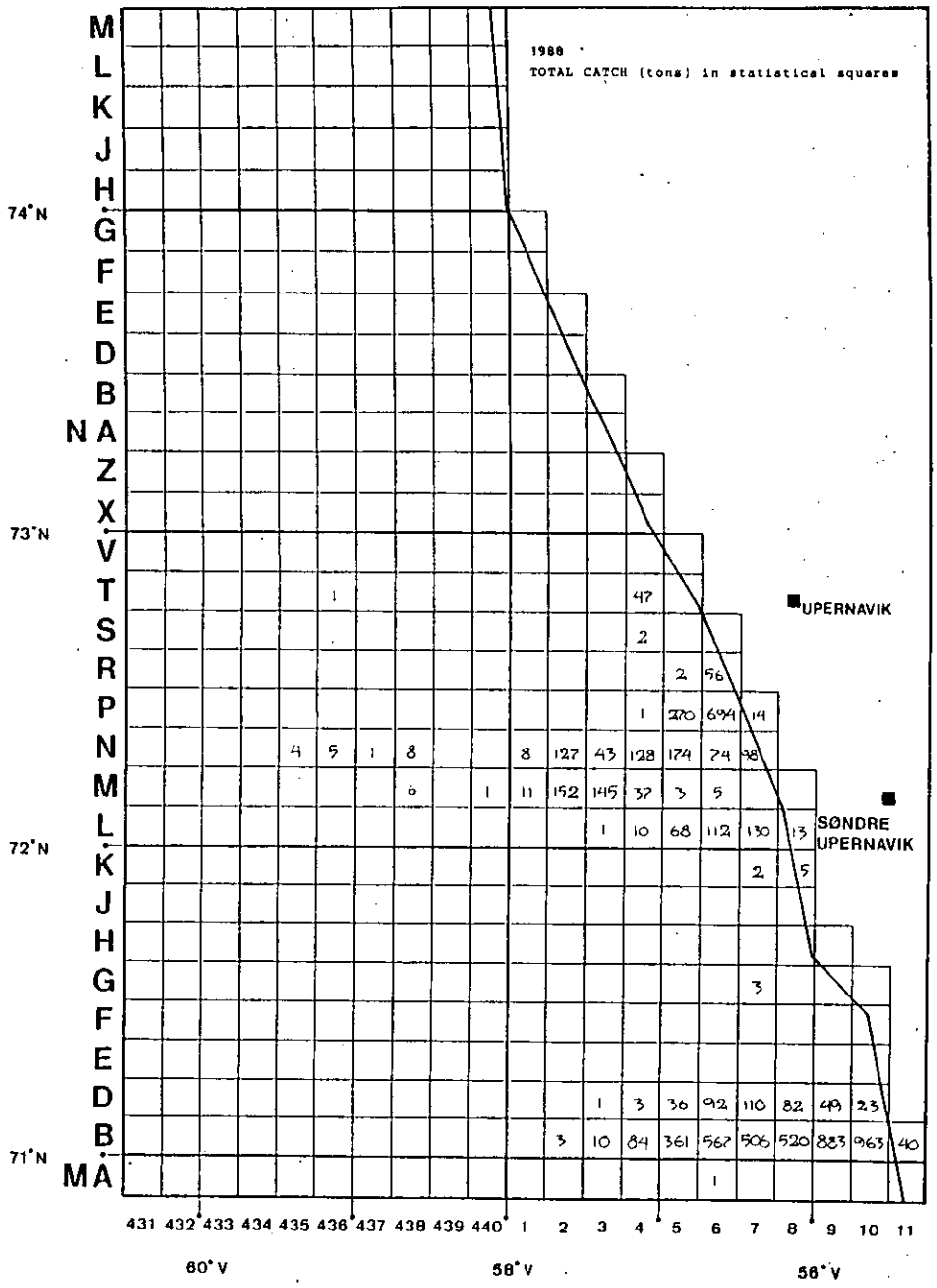

Figure 1g.
Map of the North-West Greenland fishing area (NAFO Div. 1A (Greenland management areas NV1 and NV2)) including statistical squares between the territorial sea base line and 60°30'W south of 74°37.5'N.
Distribution of total catch as registered by Greenland Fisheries Research Institute.

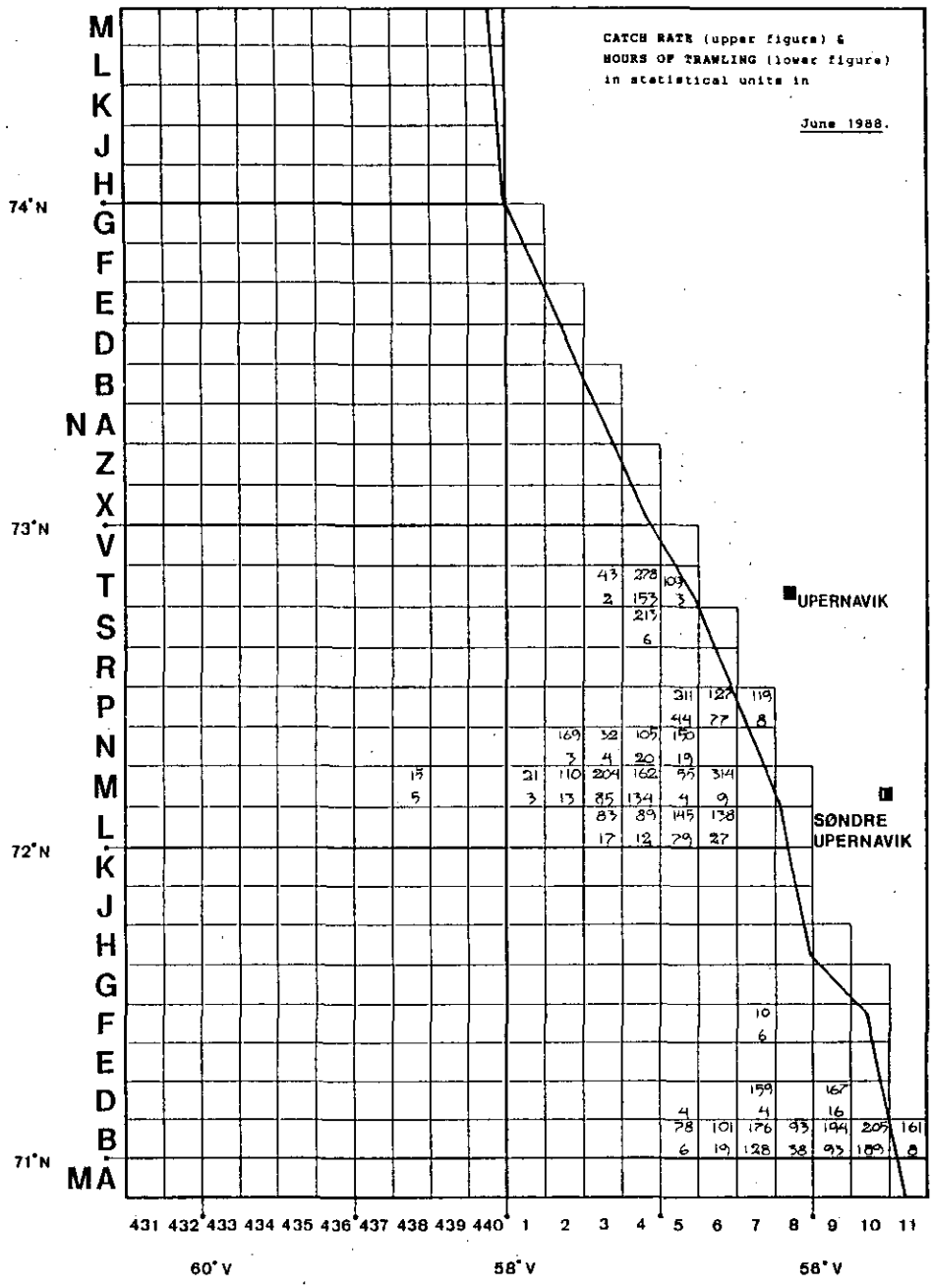
CATCH RATE (upper figure) &
HOURS OF TRAWLING (lower figure)
in statistical units in
June 1988.
UPERNAVIK
SØNDRE
UPERNAVIK
74°N
73°N
72°N
71°N
60°V
58°V
56°V

Figure 2a

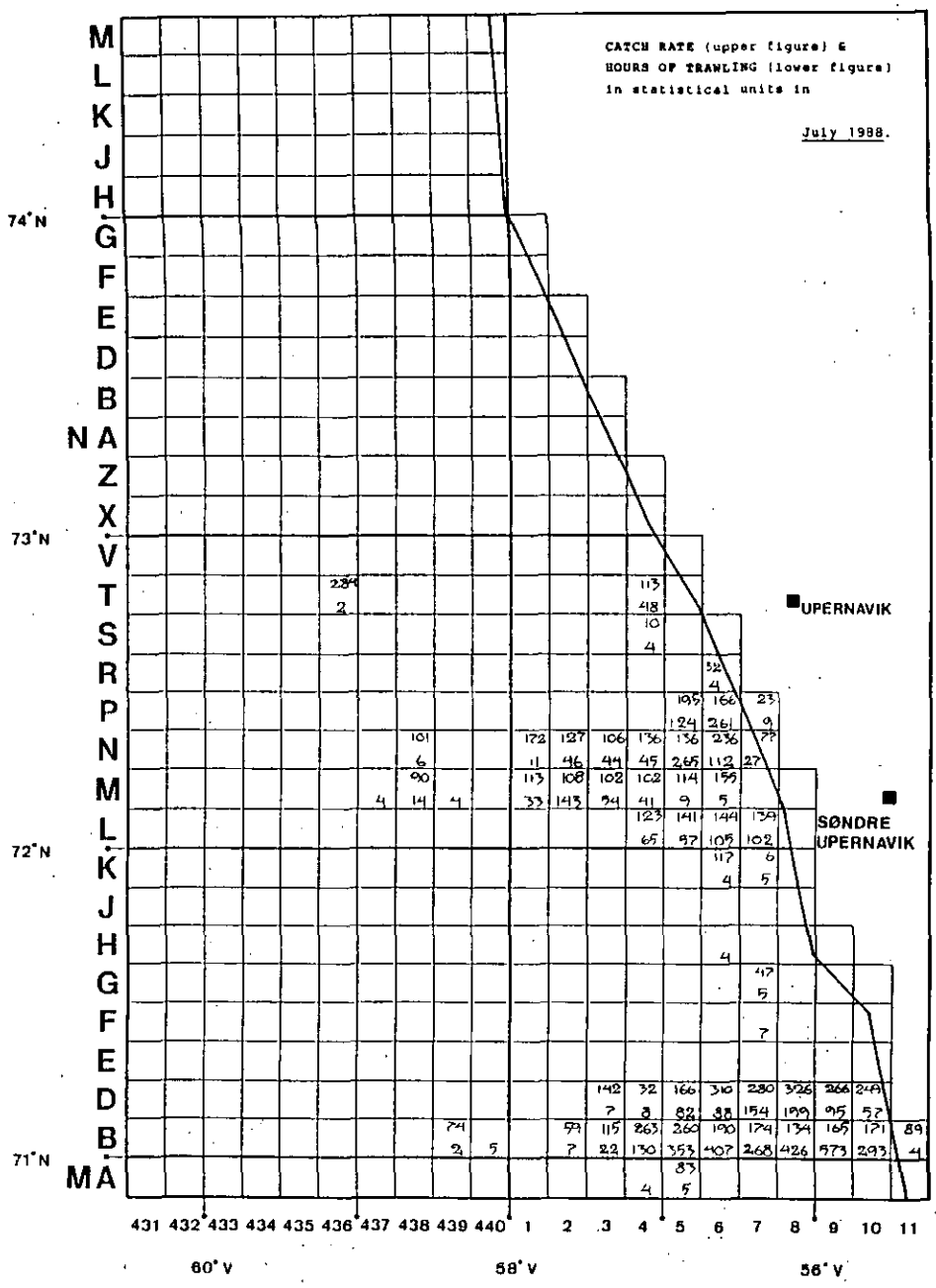
CATCH RATE (upper figure) &
HOURS OF TRAWLING (lower figure)
in statistical units in
July 1988.
UPERNAVIK
SØNDRE
UPERNAVIK
74°N
73°N
72°N
71°N
60°V
58°V
56°V
M L K J H G F E D B A Z X V T S R P N M L K J H G F E D B A
431 432 433 434 435 436 437 438 439 440 1 2 3 4 5 6 7 8 9 10 11

Figure 2b

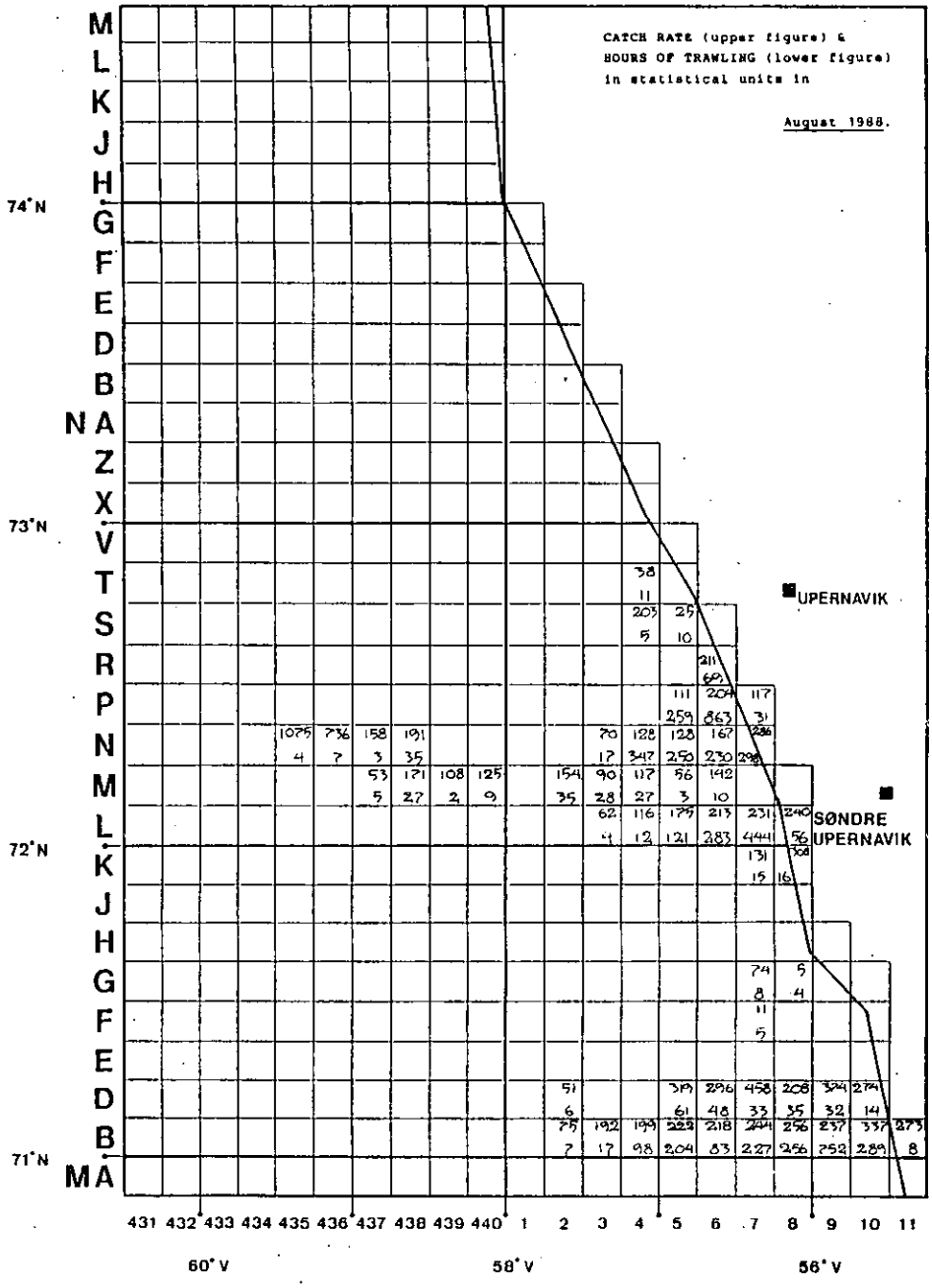
CATCH RATE (upper figure) &
HOURS OF TRAWLING (lower figure)
in statistical units in
August 1988.
UPERNAVIK
SØNDRE
UPERNAVIK
74°N
73°N
72°N
71°N
60° V
58° V
56° V

Figure 2c

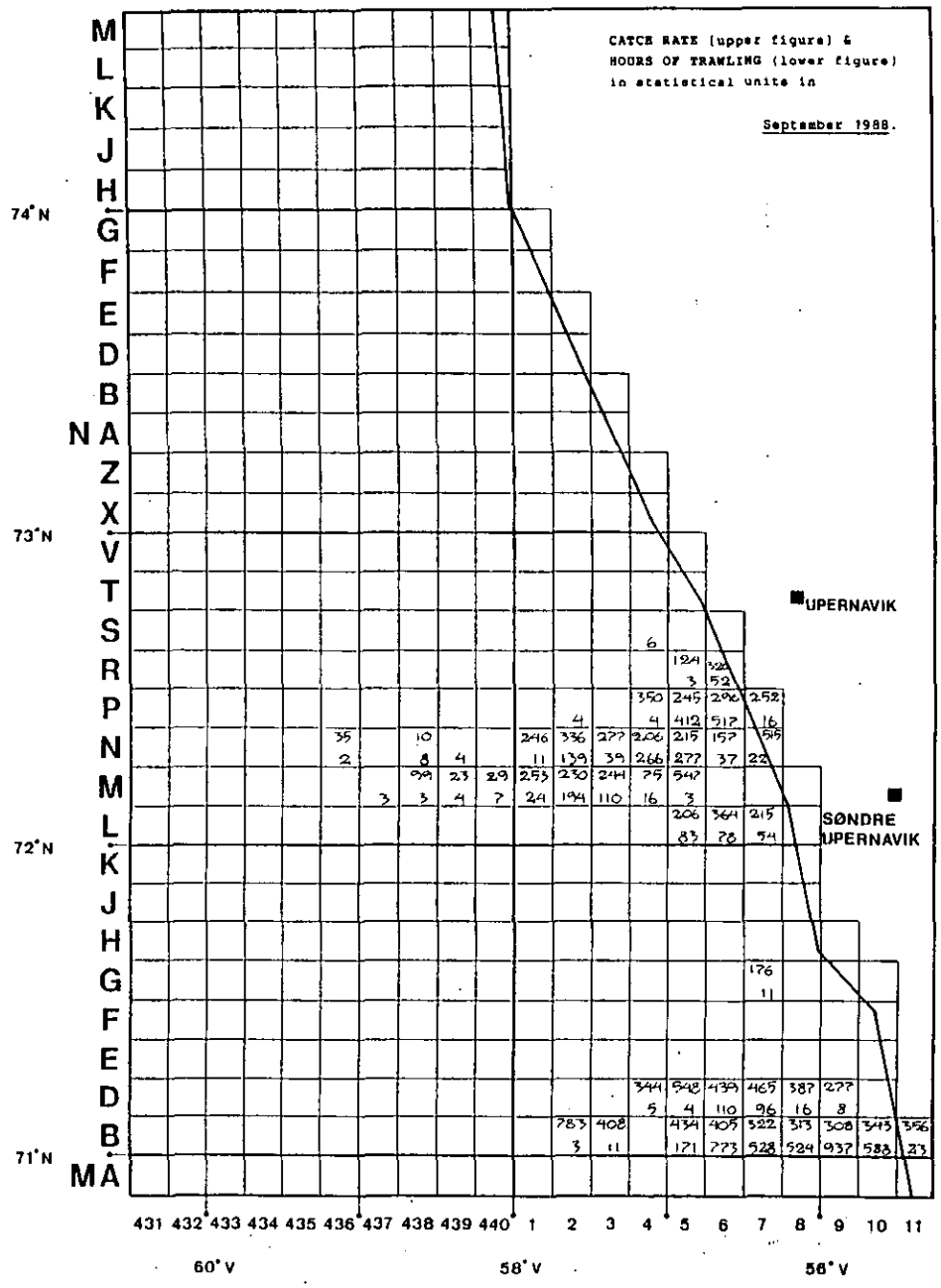
CATCH RATE (upper figure) &
HOURS OF TRAWLING (lower figure)
in statistical units in
September 1988.
UPERNAVIK
SØNDRE
UPERNAVIK
74°N
73°N
72°N
71°N
60°V
58°V
56°V
M L K J H G F E D B N A Z X V T S R P N M L K J H G F E D B M A
431 432 433 434 435 436 437 438 439 440 1 2 3 4 5 6 7 8 9 10 11

Figure 2d

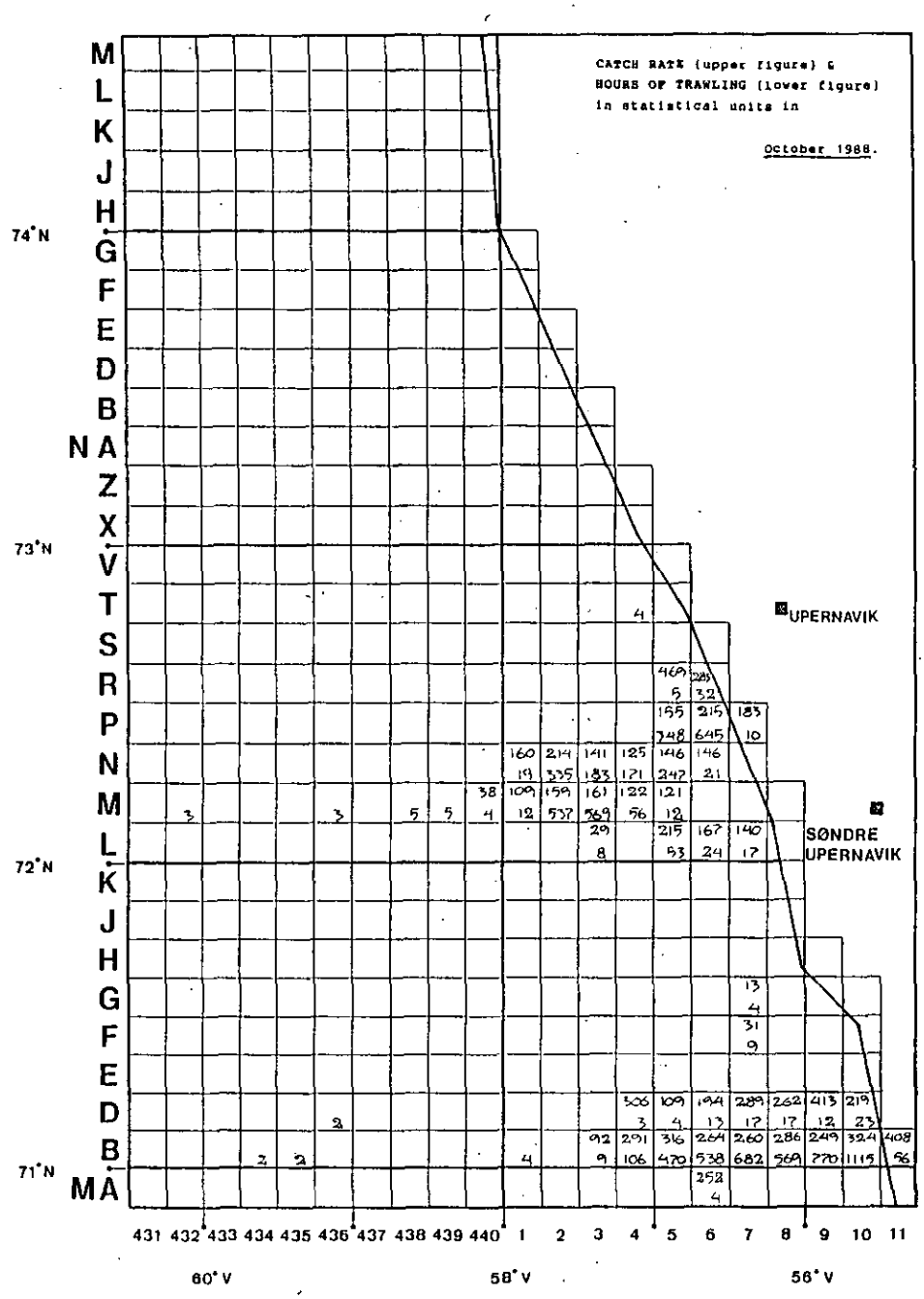
CATCH RATE (upper figure) &
HOURS OF TRAWLING (lower figure)
in statistical units in
October 1988.
UPERNAVIK
SØNDRE
UPERNAVIK
74°N
73°N
72°N
71°N
60°V
58°V
56°V

Figure 2e

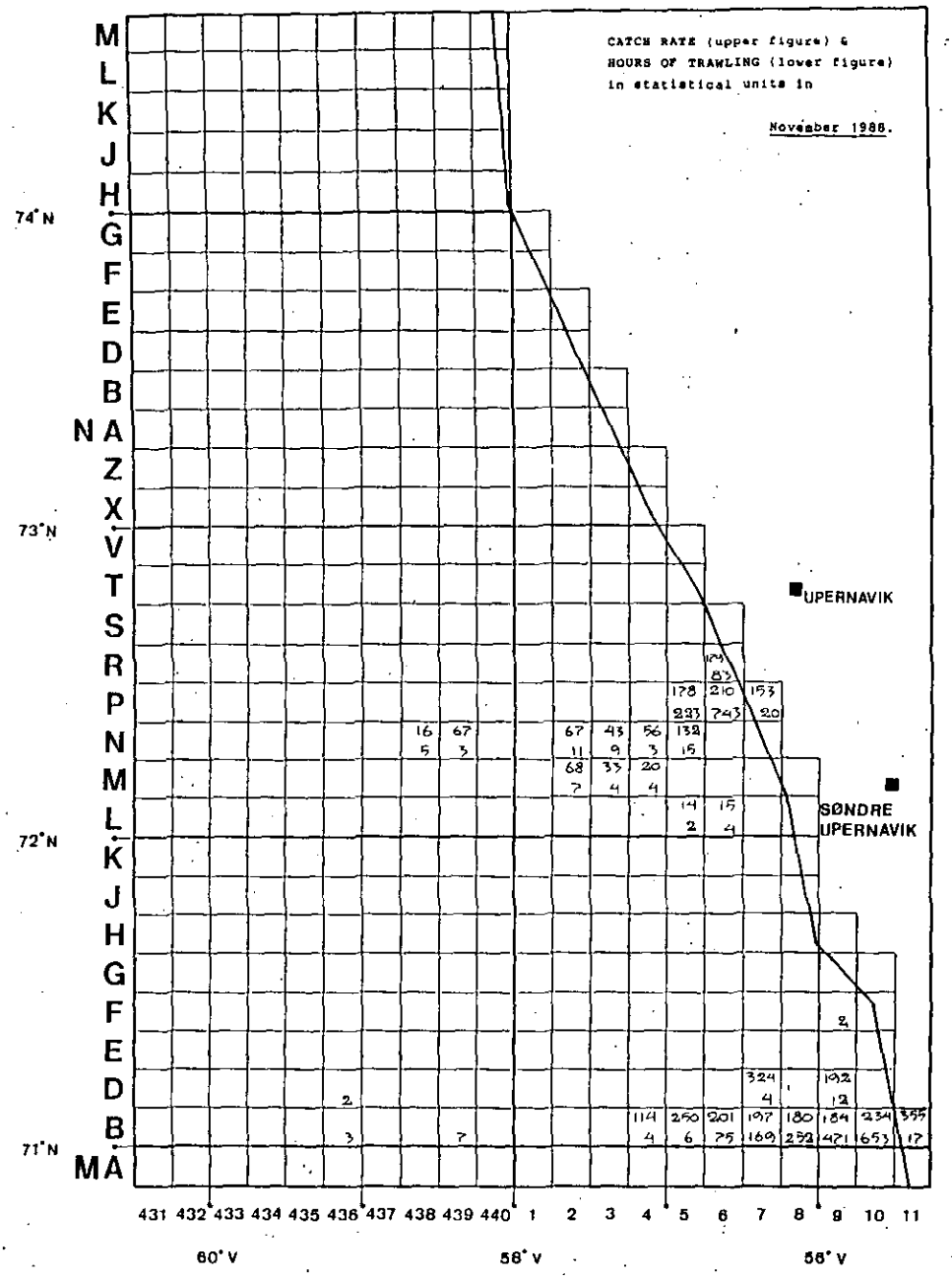
CATCH RATE (upper figure) &
HOURS OF TRAWLING (lower figure)
in statistical units in
November 1988.
UPERNAVIK
SØNDRE
UPERNAVIK
74°N
73°N
72°N
71°N
60° V
58° V
56° V

Figure 2f

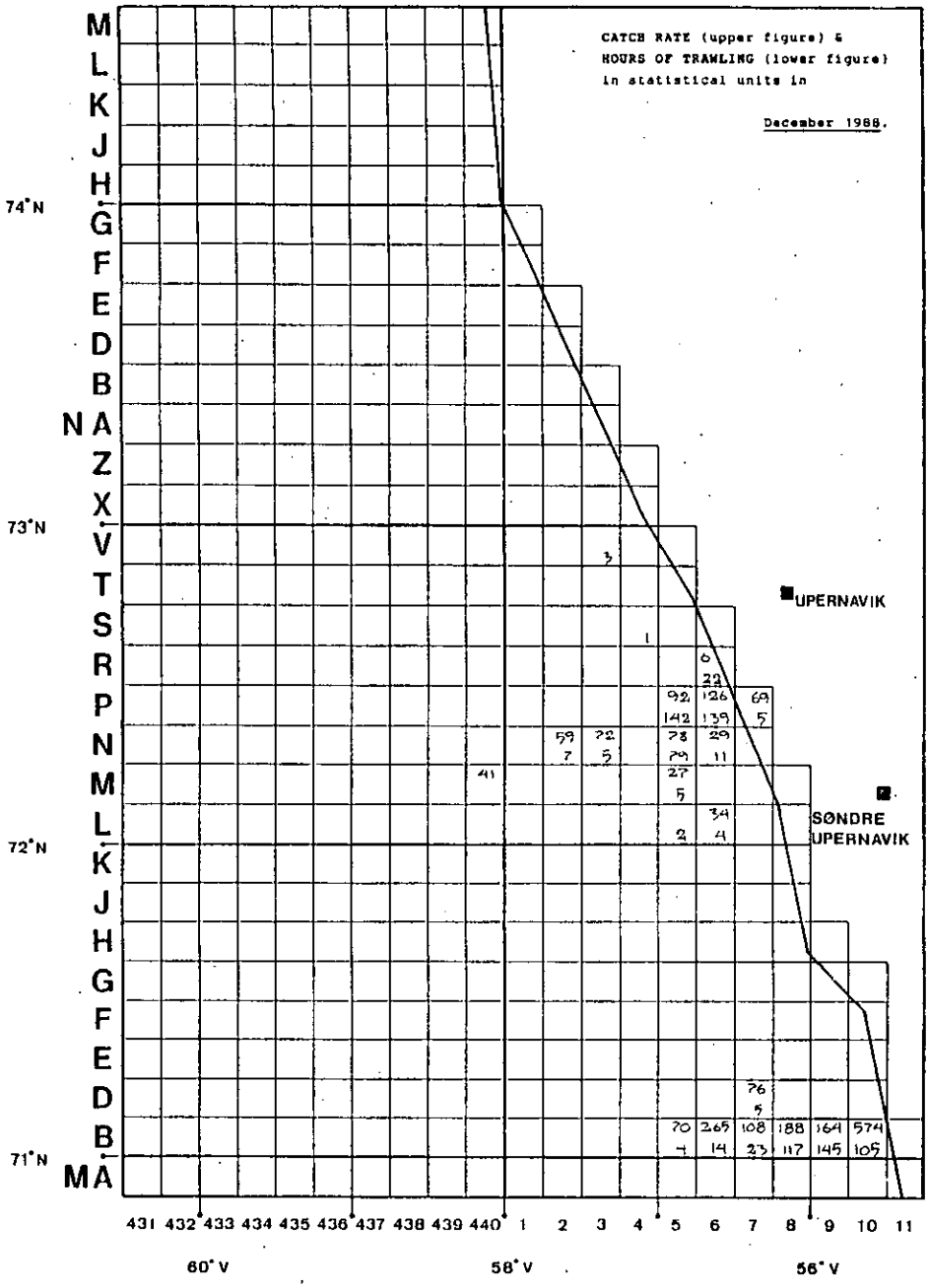
CATCH RATE (upper figure) &
HOURS OF TRAWLING (lower figure)
in statistical units in
December 1988.
UPERNAVIK
SØNDRE
UPERNAVIK
74°N
73°N
72°N
71°N
60°V
58°V
56°V

Figure 2g

SØNDRE UPERNAVIK FISHING GROUND
MEAN CPUE BY YEAR
1986 - 1988

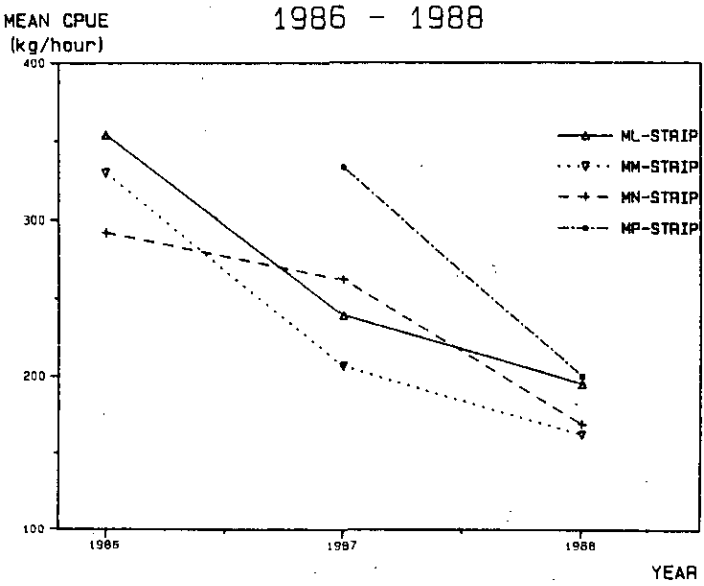

Figure 3a

UUMMANNAQ FISHING GROUND
MEAN CPUE BY YEAR
1986 - 1988

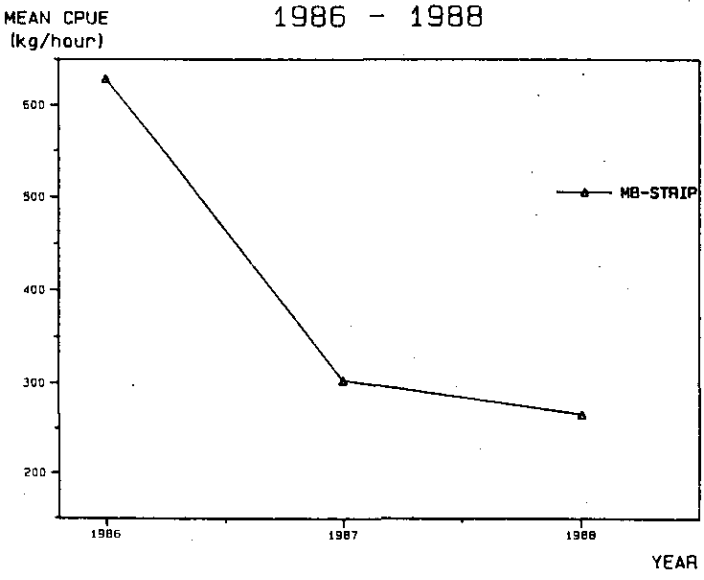

Figure 3b