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Canadian Offshore Lobster Fishery Trends

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Abstract

Landings data for Canadian offshore lobsters are compiled since the start of the fishery in 1971, along with regulations as they have evolved. There has been no decrease in median size of lobsters caught since sampling of commercial catches was begun in 1976. Catch-per-unit-effort indices, compiled for 30' x 30' areas, shows increases in the Browns Bank area, decreases in Truxton Swell, and decreases in the Corsair Canyon area where the recent lows are still higher than any values in NAFO Subarea 4X.

Closure of Browns Bank to lobster fishing in 1979 has not resulted in decreased landings. The overall decrease in 1979 is the result of decreased CPUE on Georges Bank and the probable effect of stormy weather early in the year, particularly during the April-June period that dominates landings for the whole year. Also, fishermen are becoming more reluctant to fish on weekends and under adverse weather conditions.

Résumé

Nous avons compilé les statistiques flottes de pêche de débarquements de homard capturé au large par la flotte de pêche canadienne depuis 1971, ainsi que les règlements dans le cours de leur évolution. La taille médiane des homards capturés depuis le début de l'échantillonnage des prises commerciales en 1976 n'a pas diminué. Les indices de prises par unité d'effort, compilés par aires de 30' x 30', révèlent des augmentations dans la région du banc Browns et des diminutions sur le seuil Truxton et dans le canon du Corsaire où les minima des dernières années sont encore supérieurs à toutes les autres valeurs observées dans la division 4X de l'OPANO.

L'interdiction de la pêche du homard sur le banc Browns en 1979 n'a pas causé de diminution des débarquements. La diminution globale de 1979 résulte de PUE moindres sur le banc Georges et de l'effet probable du mauvais temps, surtout d'avril à juin, période qui domine les débarquements de l'année entière. En outre, les pêcheurs sont de moins en moins disposés à pêcher en fin de semaine et par mauvais temps.

Introduction

The lobster fishery off SW Nova Scotia (lobster district 4), after a long decline from landings over 8,000 MT per year in the early 1900's to approximately 2,000 MT in the late 1930's, recovered to intermediate levels by the late 1940's and has remained relatively stable, mostly 4,000-5,000 MT per year (Fig. 1) (Stasko and Campbell 1980).

Beginning in 1971 a Canadian offshore lobster fishery, beyond a line approximately 50 n. mi. from shore, developed off SW Nova Scotia in the Browns Bank area and on eastern Georges Bank. The start of the offshore fishery coincided with several years (1971-75) of above-average (relative to 1945-1979) inshore landings in lobster district 4. The decline of inshore landings to below-average levels since 1976 has raised questions about the effect of the offshore fishery on the SW Nova Scotia inshore stocks (Stasko 1978).

Thus, it is important to assess the trends in the offshore fishery not only for its own sake (609 MT in 1979), but also for its potential impact on the much larger inshore fishery (3,778 MT in 1979 in lobster district 4). The present paper briefly describes the background in terms of growth of the fishery in the various offshore locations, and the development of regulations and conditions of licensing; and examines recent trends in landings, size frequency and catch/effort. Geographical size-frequency differences are examined in Stasko and Pye (1980).

The Fishery

In 1971 offshore lobster licenses were made available to swordfish fishermen when the swordfish fishery was closed. Eight licenses were eventually used to fish lobsters beyond a line approximately 50 miles from land from eastern Nova Scotia to the mouth of the Bay of Fundy. The number of boats over the years has varied from 5 to 8 (Table 1).

The first locations fished were Lydonia to Welker Canyon on SE Georges Bank and SE of Browns Bank in 1971. By 1972 the southern Canyons were abandoned in favour of Corsair Canyon, and some fishing was done on SW Browns Bank (Table 1, Fig. 2). The Corsair Canyon area, SE Browns and SW Browns have remained the main fishing areas. Since 1974 there has been some fishing on Truxton Swell, and a little on NE Georges Bank mostly since 1976. For convenience in data analysis, and based on the distribution of fishing effort, the offshore fishing grounds have been subdivided into five areas as shown in Fig. 2, i.e. Truxton Swell, SW Browns, SE Browns, NE Georges Bank, and Corsair Canyon. The first three, collectively called the Browns Bank area, are north of the Fundian Channel in NAFO subarea 4X. The other two are south of the Fundian Channel on eastern Georges Bank in NAFO subarea 5Ze. Altogether from 1971 to 1979, 62% of Canadian offshore lobster landings have come from the Browns Bank area (4X) and 38% from eastern Georges Bank (5Ze). Since only 8 boats fish in the offshore lobster district, decisions of an individual captain can significantly alter the geographical distribution of catches.

A number of regulations and conditions of licensing have been in force since the start of the Canadian offshore lobster fishery. It is a fishery limited to 8 boats fishing with traps. The boats must fish outside the offshore lobster line (approximately 50 n. mi. from shore, Fig. 2). That portion of the line shown as a dashed line west of Browns Bank was altered on July 12, 1979 (solid line) to conform more closely with land contours off SW Nova Scotia. The new coordinates from east to west are as follows: lat. 46°00'N - long. 58°00'W, 44°34' - 60°21', 43°43' - 63°00', 42°34' - 65°15', 42°34' - 66°10', 42°38'40" - 66°30', 42°49'20" - 66°50', 43°05'45" - 67°04'40" and 43°51' - 67°26'. Minimum legal size of lobsters is 81 mm carapace length. Each boat is required to submit a fishing log within 24 h of landing a catch.

Initially there were no restrictions on fishing season and number of traps. On April 15, 1977, the number of traps was limited to 1,000 per boat, and a 3-month closure period was introduced to be taken either July-September or January-March. Also, a preventive quota of 544 MT (1.2 million lbs) was established for 4X and 5Ze combined. When the quota was filled by late fall, the quota restriction was removed from Georges Bank only (5Ze) where American boats were fishing without quota or season restrictions. In 1978 a quota of 408 MT (900,000 lbs) and a 3-month closure were maintained in 4X only and are still in force in 1980.

On April 25, 1979, Browns Bank was closed to lobster fishing. The closed area (42°55'N 66°30'W, 42°21'N 66°30'W, 42°21'N 65°13'W, 42°55'N 65°13'W) lies on both sides of the offshore lobster boundary (Fig. 2), i.e. partly in the offshore lobster district A and partly in lobster district 4. The closure was instituted at a time when lobster landings in district 4 were declining and when studies indicated a possible recruitment supplement from offshore to inshore areas by means of larval contribution from offshore. The closure remains in effect for 1980.

Trends

Has the offshore fishery had any measurable impact on lobster stocks offshore? Has the closure of Browns Bank affected the landed weight of lobsters in 1979? These questions are here approached by examining trends in size frequency, landed weight, and catch-per-unit-effort for the several offshore lobster areas.

One single-number representation of size frequency is the median size. The medians are tabulated in Table 2 as mean values for each year for each of four offshore areas since the start of in-port sampling in 1976 and at-sea sampling in 1977. In none of the eight comparisons (4 areas, 2 types of sampling) is the 1979 average median size the lowest. In fact, in 6 of the 8 comparisons the 1979 average median size is the largest. Thus, there appears to be no decrease in size of animals in the offshore areas since 1976 when sampling began.

The landings by offshore areas are shown in Table 1. Total landings reached a high level in 1976 (678 MT), down in 1977, up to a high of 684 MT in 1978, then sharply down to 609 MT in 1979. The 1979 decline occurred on Georges Bank (5Ze) in the Corsair area. Within the Browns Bank area (4X) a decline in SW Browns landings is compensated by an increase in SE Browns, representing a relocation of fishing effort but no loss of landings due to closure of Browns Bank in 1979.

Examination of CPUE (kg/trap haul) by 30'x 30' areas by year for 1973 to 1979 (Fig. 3) shows no declines in SE Browns and just west of Browns Bank. In the lightly fished areas further west of Browns Bank and on Truxton Swell there appears to be a decline in CPUE. On the eastern edge of Georges Bank centered around Corsair Canyon the CPUE shows a steady decline, though even the low CPUE values in the most heavily fished 30'x 30' area in 5Ze are still higher than most values in 4X. In Corsair Canyon traps are fished close together in a limited area such that trap concentrations here are probably greatest of any Canadian offshore lobster area. This combined with sustained high landings since 1972 makes Corsair Canyon the location most susceptible to local overfishing. In addition, continued trap losses must provide an increasing amount of competing effort in the form of ghost traps. Nevertheless, Corsair Canyon proper still continues to provide the highest landings (Table 1) and the largest animals (Table 2) of the five offshore areas.

A further cause for the relatively low 1979 landings may be stormy late-winter and early-spring weather in 1979. For example, the number of fishing days January to June in 1977-78-79 were 404-370-329, with resulting landings of 359-404-315 MT (Table 3). The very few January-March trips in 1979 (only 15 trips compared to 36 and 31 in 1977 and 1978) result in long soak times for traps, with resulting reduced catch rates for soak times in excess of about 10 days. In the April-June period, per-day catch rates are usually highest of the year and trips longest. Thus, the reduction in boat trips during April-June from 58 in 1978 to 52 in 1979 dominates the overall landings. Altogether, the number of fishing trips and days fished in 1979 is lowest of the three years and reflect, in part, a growing reluctance to fish on weekends and under adverse weather conditions. The 1979 seasonal catch rates in kg/day, aside from the low January-March 1979 ones probably due to excessive soak times, are higher than in 1977.

Conclusions

- Closure of Browns Bank to lobster fishing in 1979 has not resulted in decreased landings from NAFO subarea 4X -- 380 MT in 1979, compared to 374 MT in 1978.

- There is no decrease in median size of lobsters since the start of sampling in 1976 in any of the offshore lobster fishing areas (Truxton Swell, SW Browns, SE Browns, eastern Georges).

- The overall decrease in 1979 offshore lobster landings is the result of decreased catches only on Georges Bank (5Ze), due to decreasing CPUE (kg/trap haul) and probable effect of stormy weather and changing attitudes in reducing the fishing time, particularly in the April-June period that dominates landings (nearly 50%) for the whole year.

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References

- Stasko, A.B. 1978. Inshore-offshore SW Nova Scotia lobster stock interactions: a hypothesis. CAFSAC Res. Doc. 78/37, 10 p.
- Stasko, A.B. and A. Campbell. 1980. An overview of lobster life history and fishery in southwestern Nova Scotia. Can. Fish. Aquat. Sci. Tech. Rep. 954: 208-224.
- Stasko, A.B. and R.W. Pye. 1980. Geographical size-frequency differences in offshore lobsters. CAFSAC Res. Doc. 80/57.

Table 1. Canadian offshore lobster landings in metric tons by area fished, as per locations (see Fig. 2) reported in fishermen's logs. Landings are based on a combination of fishermen's logs, fisheries officers' reports and sales slips. Where log records were not available, locations are estimated on the basis of previous and subsequent locations fished by each boat.

Year	Browns Bank area (4X)			Georges Bank (5Ze)		Combined areas - MT (%)			% landings reported in logs	No. of boats
	Truxton Swell	SW Browns	SE Browns	NE Georges	Corsair area	4X	5Ze	Total		
1971	-	-	8	92*	-	8 (8)	92 (92)	100	22.4	5
1972	-	22	158	-	154	180 (54)	154 (46)	334	26.5	6
1973	-	136	181	9	167	317 (64)	176 (36)	493	41.4	7
1974	10	122	149	-	135	281 (68)	135 (32)	416	68.6	6
1975	18	117	247	-	163	382 (70)	163 (30)	545	83.0	8
1976	71	307	118	14	168	496 (73)	182 (27)	678	92.8	7
1977	70	220	68	48	229	358 (56)	277 (44)	635	98.4	8
1978	53	240	81	33	277	374 (55)	310 (45)	684	100.0	8
1979	36	240	105	2	226	381 (63)	228 (37)	609	100.0	8
'71-79	258	1404	1115	198	1519	2777 (62)	1717 (38)	4494		

*These 1971 landings are from the Welker to Lydonia Canyon area on SE Geroges Bank.

Table 2. Averages of median carapace length (mm) for in-port and at-sea samples 1976-79 by area by year. In deriving these average median values, the median for each sample (trip) is weighted equally.

Year	Truxton Swell			S W Browns			S E Browns			*Georges		
	Avg. med.	No. of trips	No. of anim.	Avg. med.	No. of trips	No. of anim.	Avg. med.	No. of trips	No. of anim.	Avg. med.	No. of trips	No. of anim.
IN-PORT SAMPLING												
1976	112	5	769	113	10	1,413	122	6	838	126	6	1,058
1977	107	1	263	110	3	512	122	2	187	127	6	917
1978	118	1	152	116	4	731	120	1	310	126	8	1,935
1979	113	3	366	116	10	1,576	124	14	2,079	129	19	2,145
AT-SEA SAMPLING												
1977	108	2	2,805	112	4	5,264	132	1	14	129	3	1,204
1978	110	3	948	115	2	2,226	120	1	567	127	3	1,474
1979	110	2	409	115	4	1,746	127	1	662	130	2	1,916

*All but 2 of the Georges Bank samples are from the Corsair Canyon area.

Table 3. Seasonal variations in catch and fishing effort, 1977 to 1979.

Season	1977					1978					1979				
	Catch MT	No. of trips	Days per trip	No. of days	Kg per day	Catch MT	No. of trips	Days per trip	No. of days	Kg per day	Catch MT	No. of trips	Days per trip	No. of days	Kg per day
Jan.-March	84	36	2.8	102	829	57	31	2.5	78	733	20	15	3.3	49	409
April-June	275	54	5.6	302	910	347	58	5.3	292	1187	295	52	5.4	280	1056
July-Sept.	161	55	3.5	190	848	177	62	2.4	151	1173	143	58	2.6	150	951
Oct.-Dec.	115	36	4.0	144	798	103	38	3.4	130	794	150	43	3.8	162	928
Total	635	181	4.1	738	861	684	189	3.4	651	1051	608	168	3.8	641	949

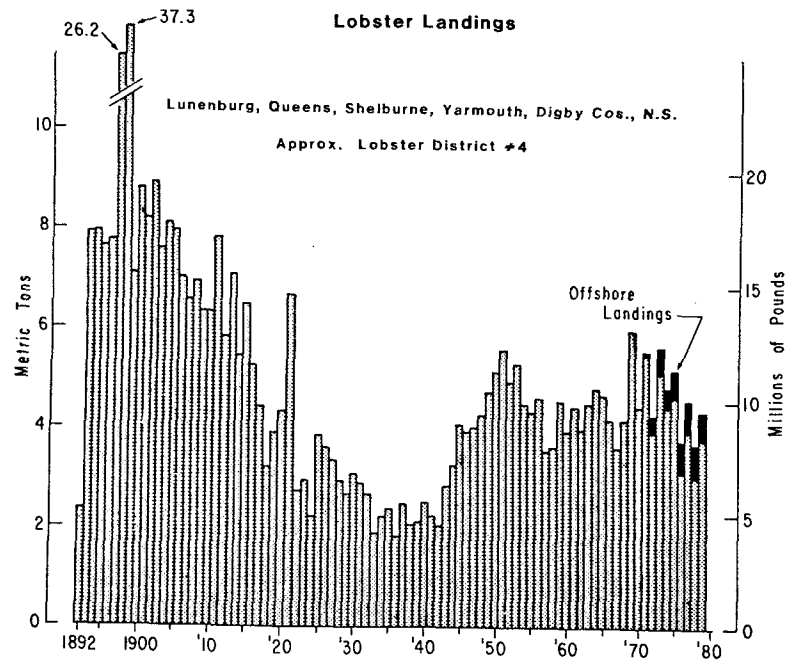


Fig. 1. Annual lobster landings from lobster district 4 (approximate). Landings from the offshore lobster district (beyond approx. 50 naut mi. from shore) are shown in black,

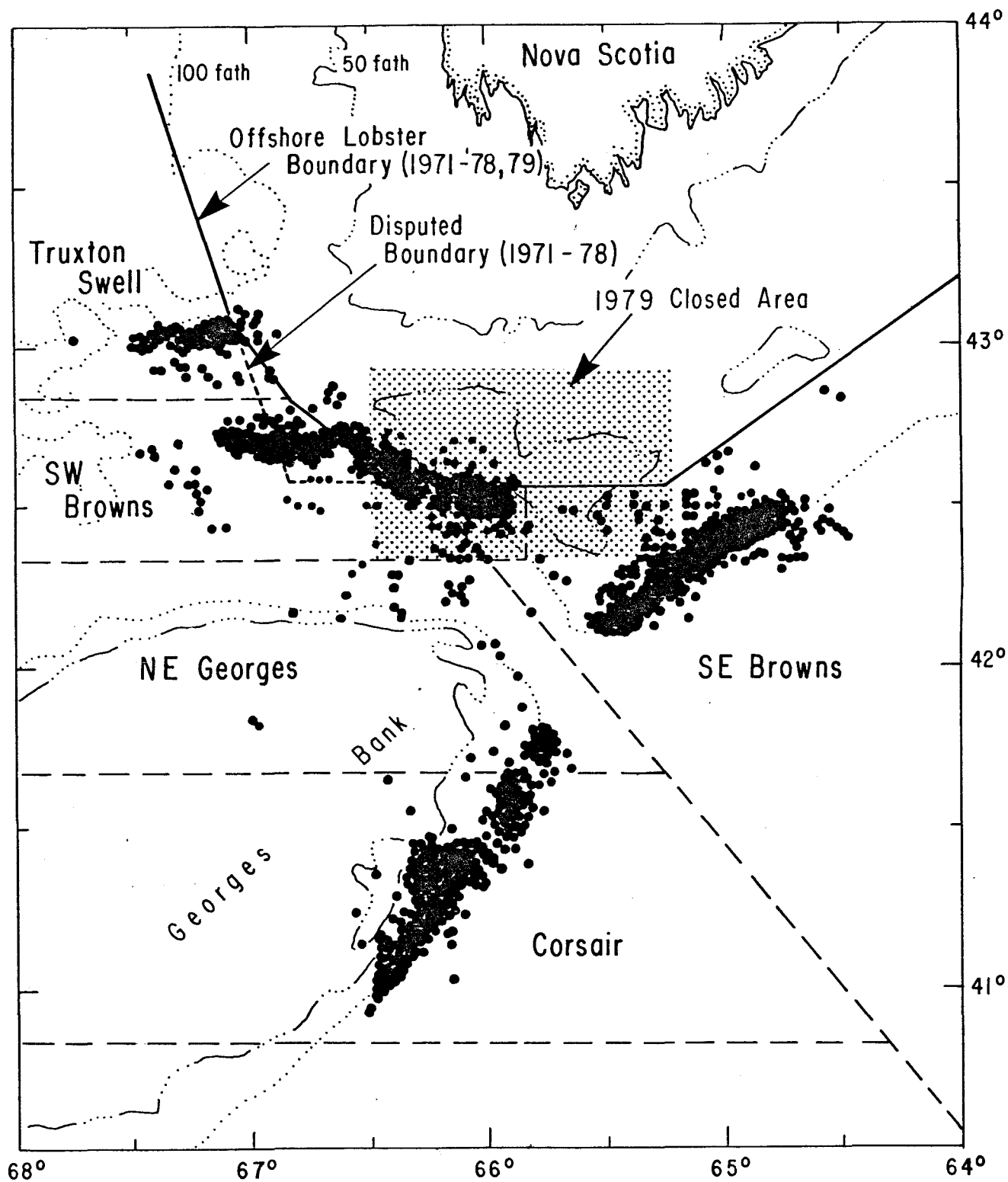


Fig. 2. Canadian offshore lobster fishing areas. Dots indicate fishing location based on fishermen's log books 1973-79. Five subareas are identified for analyses; Truxton Swell, SW Browns, SE Browns, NE Georges and Corsair.

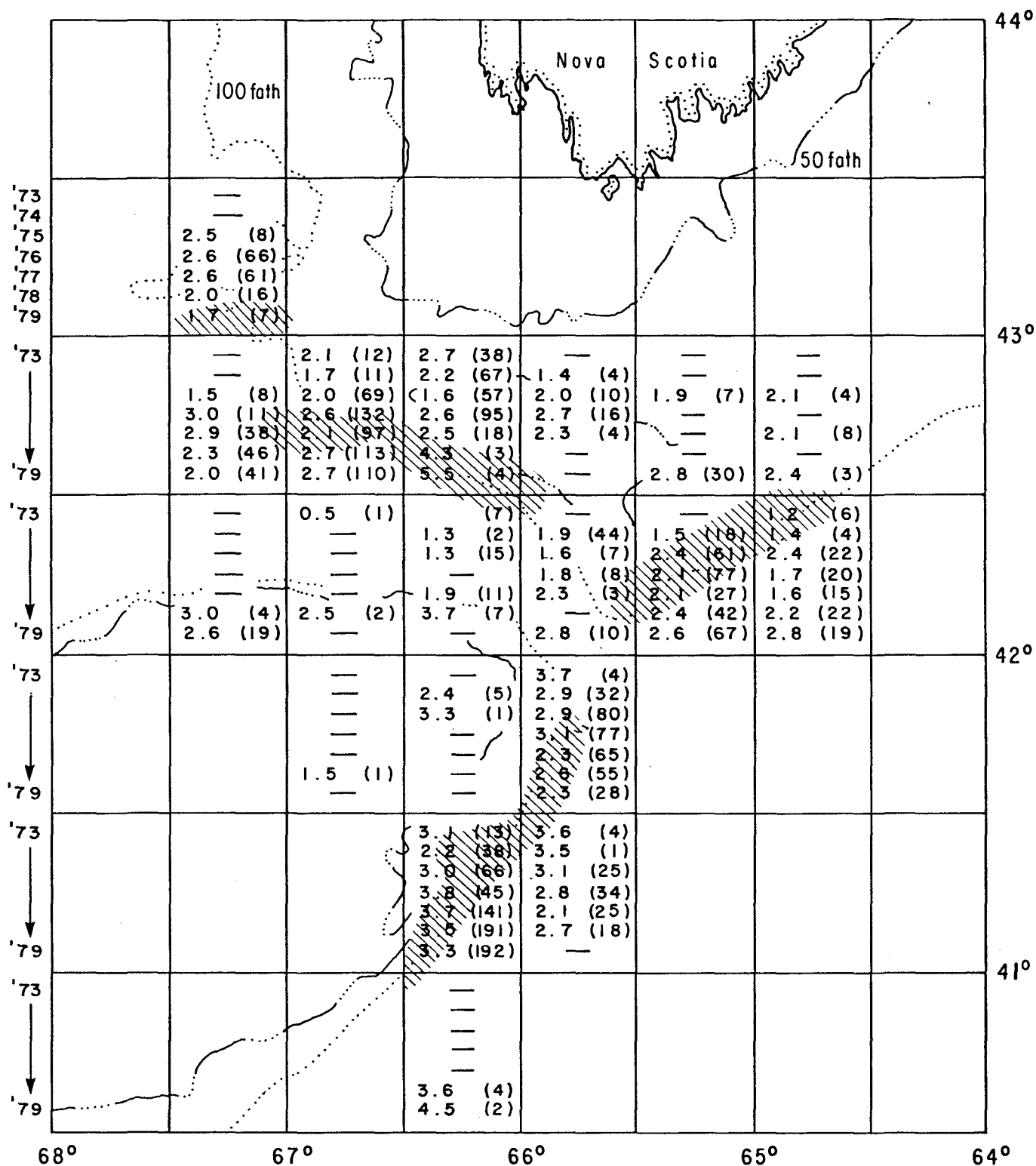


Fig. 3. Commercial catch/effort in kg per trap haul per year 1973 to 1979, followed in brackets by catch in MT, for 30'x30' areas. Catches, for which location is not known, are excluded. Also excluded are data with less than 1 MT per year per 30'x30' area. Sequence of numbers within each rectangle is 1973 at top to 1979 at bottom. Concentrations of commercial fishing effort are shown as shaded areas.