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A description of Canadian fisheries in Subarea 5 and Statistical Area 6, 1969-72[1]

by

R.G. Halliday
Fisheries and Marine Service
Biological Station, St. Andrews, N.B.

INTRODUCTION

Canadian fisheries in ICNAF Subarea 5 and Statistical Area 6 resulted in landings of 17,000-37,000 metric tons of finfish annually in 1969-72, excluding small quantities of large pelagic species (swordfish and tunas), (Table 1). Herring accounted for 11,000-28,000 tons of this, the remainder being groundfish, particularly cod, haddock and pollock. Canada also prosecuted a specialised sea scallop fishery with landings of about 35,000 tons annually, and a small offshore lobster fishery was initiated in 1971. There are virtually no Canadian landings from Stat. Area 6.

The fisheries for large pelagics and invertebrates are highly specialised and the bycatch of other species is insignificant. These fisheries are not currently of interest to the Effort Limitation Working Group, and thus are not discussed further here.

THE CANADIAN HERRING FISHERY

Canadian herring landings increased from 11,000 tons in 1969 to 28,400 tons in 1971, but declined to 11,700 tons in 1972 in part due to imposition of catch quota regulations but also due to increased herring availability in the Bay of Fundy. Virtually all of these fish were caught in the Jeffrey's Ledge area (Div. 5Y) except in 1971 when 13,000 tons were caught on the northern edge of Georges Bank (Div. 5Z).

This is almost entirely a purse seine fishery. There probably are small incidental catches of mackerel made, but the fishery is directed entirely to herring. As mackerel catches, if made, are discarded, there are no statistics available on quantities involved, but certainly mackerel catches are insignificant in proportion to herring catches.

Most of the Canadian herring catch in Subarea 5 is landed directly in the USA, and statistics on the fishery are particularly difficult to obtain. No details are available for 1969 and 1970.

The Georges Bank fishery conducted in 1971 involved 17 vessels which made 112 trips. The fishery was conducted from June to October but over 60% of the catch was made in August and a further 25% in September. The vessels involved ranged from 70-625 gross tons (65-156 ft. overall length). Of these, 7 were in the tonnage class 51-150 g.t., 9 were 151-500 g.t., and one was 652 g.t.

The Jeffrey's Ledge fishery in 1971 was conducted almost entirely in September and October, with small landings in April and May. In 1972, the fishery was conducted in April and May, and August to October, with landings fairly evenly distributed among months. In 1971, 14 vessels were involved many of which were the same as those which fished Georges Bank in that year. The smallest was 180 g.t.

[1] Presented to the Special Commission Meeting, FAO, Rome, January 1974, as Res. Doc. 74/27.

(102 ft. overall length) and the largest 477 g.t. (135 ft. registered length). In 1972, 14 vessels were involved also, although some were considerably smaller than those engaged in the fishery in 1971. Two vessels were in the 26-50 g.t. class, 5 were 51-150 g.t, and 7 were 151-500 g.t., the largest being 396 g.t.

The future of Canadian herring fisheries in Subarea 5 is largely dependent on Canadian allocations of catch quotas. The Canadian fleet has considerable overcapacity in relation to current Canadian allocations in Subarea 5 and Div. $4W_b$-4X. Although part of the herring fleet could convert to groundfish fishing, the groundfish sector of the Canadian fleet in this region also has an overcapacity in relation to available resources, thus this is not in general a viable alternative. Some effort could be diverted to mackerel, but marketing difficulties make it unlikely that this will be a major development in the immediate future.

THE CANADIAN GROUNDFISH FISHERIES

Fleet Composition.

Canadian groundfish fisheries in Subarea 5 are conducted by otter trawlers and longliners.

A few otter trawlers less than 50 gross tons and between 51-150 gross tons fish the area but most of the fleet is composed of side otter trawlers of 151-500 gross tons and stern otter trawlers of 501-900 gross tons (Table 2). The number of otter trawlers which fished in Subarea 5 declined from 61 in 1969 to 29 in 1972. It is common practice for Canadian trawlers to fish only part of a trip in Subarea 5 and the remainder in Subarea 4. Adding together the parts of trips in Subarea 5, trawlers fished the equivalent of 230 full trips in 1969. This declined to 66 full trips by 1972. For the smaller otter trawlers, a trip may last only 3 or 4 days. However, the larger vessels over 150 gross tons, which comprise the bulk of the fleet fishing Subarea 5, normally fish 7-9 days per trip. Canadian effort declined (very approximately) from 1800 days to 500 days between 1969 and 1972. Landings also declined substantially from about 13,000 tons in 1969 to 2,800 tons in 1972.

Between 21 and 31 longliners, mainly of 26-150 gross tons in size, fished Subarea 5 in 1969-72(Table 2). About 100 trips per year were fished by these vessels in 1969-71, increasing to 175 trips in 1972. Landings rose steadily from 1,500 tons in 1969 to 2,800 tons in 1972. There are also small quantities of fish caught in Subarea 5 by 0-25 gross ton longliners which are erroneously reported in ICNAF statistics as originating from Div. 4X.

Seasonality of Fisheries.

Canadian groundfish landings are taken mainly in the May to November period, with effort spread fairly evenly throughout these months (Table 3).

Catch rates of otter trawlers (kg/hr fished) do not vary greatly throughout the fishing season (Table 4). Catch rates in the January to April period are normally as good as, or better, than in other months of the year. This may not be a reliable indication of the seasonal availability of the species fished, as very little effort is expended in Subarea 5 in these months. However, the seasonality of Canadian otter trawl fishing in Subarea 5 is as much, or more, a function of the relative availability of groundfish in Subareas 3 and 4, than in Subarea 5 itself. The northern grounds are more traditional for Canadian fishermen and are in large part nearer home ports.

The seasonality of the longline fishery is strongly influenced by weather conditions, these small vessels normally operating much closer to home ports in southwestern Nova Scotia, or engaging in other activities, in winter months.

Species sought.

Canadian otter trawl effort increased substantially in Subarea 5 in the mid-1960's and was directed primarily towards haddock. With decline in haddock abundance, effort also declined, and in the 1969-72 period, the species sought were cod, haddock, and pollock. The fisheries for these three species are not distinct. The species sought may vary several times within a trip depending on relative availability. Haddock, despite decreasing abundance and landings, remains a prime species as a result of substantial increases in market value.

Longliners fish primarily for cod, but some effort is directed towards haddock and there are important bycatches of cusk although this is seldom, if ever, the prime species sought. Some effort is also directed towards halibut.

Possible future changes.

Declining cod abundance in Div. 4X, catch quota restrictions on other cod stocks in Subarea 4, closure of Subarea 4 haddock fisheries, and anticipated decline in the Gulf of St. Lawrence redfish fishery, will make Subarea 5 groundfish fisheries more attractive to Canadian fishermen. The Gulf of St. Lawrence redfish fishery in particular has absorbed much of the effort of the larger otter trawlers from Nova Scotia ports. It is these vessels which are most likely to divert effort to Subarea 5. Thus, the current trend of declining Canadian interest in Subarea 5 fisheries is unlikely to continue and may well reverse.

A substantial change in species sought is not anticipated, and is in part mitigated against by current catch quota regulations.

Some change in species sought and in effective effort could result from introduction of midwater trawling techniques to Canadian Subarea 5 fisheries. Most Canadian stern trawlers over 500 gross tons which fish from Nova Scotia ports are now equipped as combination midwater-bottom trawlers. Midwater trawling effort has been directed primarily to redfish in the Gulf of St. Lawrence - a change which resulted in very substantial increases in catch rates in comparison to bottom trawling. Increased catch rates in the Sydney Bight winter cod fishery have also been obtained by midwater trawling, although the importance of this development for cod fishing has yet to be established. Extension of midwater trawling to the pollock fishery is also a possible development. Introduction of this technique to Canadian Subarea 5 groundfish fisheries could result in a substantial increase in the effective effort of the fishing vessels involved.

Detailed fishing records.

Listings of the most detailed catch and effort data available for individual Canadian otter trawlers in 151-500 g.t. and 501-900 g.t. tonnage classes for 1969-72 fisheries in Subarea 5 are available from the author and the Chairman of the Effort Limitation Working Group.

These data were obtained by amalgamating the trip weigh-out by species at the port of landing (which gives accurate quantities of each species landed) and the vessel Captain's log record, which gives the fishing effort and temporal distribution of the catch throughout the trip, as well as the positions of capture.

There are a number of deficiencies in these data. In the period 1969-72, log record keeping was voluntary and only part of the fleet provided these records. However, coverage of the vessels over 150 gross tons was fairly comprehensive. The quality of the information in very variable. Some records give only daily information

on position fished, catch, and effort. Others give this information by 6 hour watch, while some records give tow by tow details. Only the species of which there was a substantial catch in a given tow are recorded in the log. Thus, although the distribution of the catch among tows is fairly accurate for the main species fished, incidental catches may not be recorded. Therefore, the recorded catch for the entire trip in many cases indicates species catches which do not occur in the tow by tow records. Similarly, discards are almost invariably neglected and no useful information on them is available from log records.

A further source of error occurs from the habit of fishing only part of a trip in Subarea 5 and the remainder in Subarea 4. For these trips, the landings are prorated on the basis of log records giving the position of capture. This is probably fairly accurate for the main species which are normally entered in the log record. However, for species taken as bycatch and thus not recorded in the log, prorating must be done on the proportion of effort in each Subarea, which could introduce errors.

Effort data.

For those Canadian vessels which kept log books in 1969-72, four measures of effort are available - number of trips, days at sea, days fished, and hours fished. These data are presented in tables 6 and 7 for 151-500 gross ton and 501-900 gross ton otter trawlers respectively, which fished in Subarea 5 in 1969-72.

None of these effort measures are identical to that contained in a U.S. regulatory proposal for Subarea 5 and Statistical Area 6, i.e. "days in the regulated area". Days fished does not include days in the area in which no fishing took place, whereas days at sea includes time spent steaming to and from port which is largely spent in Subarea 4 hence outside the proposed regulated area.

It is of interest none-the-less to examine the relationship between days at sea and days, and hours, fished (Table 8). These relationships are sufficiently variable that moderate increases in effective effort could be attained under a regulation based on days at sea by manipulating the seasonality of fisheries and changing fishing practices. The ratio of days fished to days at sea for 501-900 g.t. vessels increased 5%, and the ratio of hours fished to days at sea increased 13% between 1969 and 1971. This was associated with declining catch-per-effort (Table 4). When catch rates in 1972 increased approximately to 1969 levels the hours fished:days at sea ratio declined to about 1969 levels. The hours fished per day at sea for 501-900 g.t. trawlers in June was 12% higher than the annual average.

Details of the catch rates associated with these effort measures for all species and for individual species are available from the author.

Trawl gears used.

Various bottom trawl gears are used by Canadian vessels in Subarea 5, the most common being the Atlantic Western trawls No. 2 and No. 3. Others used in the 1969-72 period were the Yankee No. 41, Granton, Engel high-opening bottom trawl, and the Box A2. The specifications of these trawls (with the exception of the Box A2 for which no specifications are available), and for the Diamond 9 mid-water trawl are given by Carrothers (M.S. 1974-this meeting). The latter net is that currently used in the Canadian Gulf of St. Lawrence redfish fishery, but has not been used to date in Subarea 5.

TABLE 1. Canadian catches in SA5 (Stat. A.6) excluding large pelagics (metric tons round).

	1969	1970	1971	1972
Finfish	25,546	25,168	36,706	17,402
Groundfish	14,539	7,166	8,323	5,707
Pelagic fish	11,000	18,000	28,381	11,692
Other fish	7	2	2	3
GROUNDFISH				
Cod	6,056	2,609	3,098	2,598
Haddock	4,049	2,016	1,715	632
Redfish	260	338	269	124
Halibut	96	67	38	37
Plaice	68	87	40	22
Greenland halibut	-	-	-	2
Winter flounder	110	61	62	8
Witch	39	15	31	13
Yellowtail	329	75	105	9
Flounders NS.	74	19	16	1
Cusk	726	813	1,040	774
Pollock	2,443	853	1,636	1,366
White hake	34	46	100	37
Wolffish	94	-	98	36
Groundfish NS.	161	167	75	48
PELAGIC FISH				
Herring	11,000	18,000	28,381	11,691
Mackerel	-	-	-	1
OTHER FISH				
Skates	7	1	2	3
Other fish NS.	-	1	-	-
INVERTEBRATES				
Sea scallops	35,851	34,006	32,434	34,671
Squid	-	-	1	-
Lobster	-	-	101	203
Others	-	-	-	9

Table 2. Summary of Canadian groundfishing activity in Subarea 5, 1969-72.

Type of Fishing	Tonnage Class	No. of vessels				No. of trips				Total Landings (m.t.)			
		1969	1970	1971	1972	1969	1970	1971	1972	1969	1970	1971	1972
O. T. Stern	501-900	18	13	18	13	130.2	45.5	60.5	21.9	9314	3199	3991	1833
	151-500	4	2	1	2	15.0	4.3	1.0	1.4	670	280	47	72
	51-150	2	2	3	1	6.0	3.8	6.0	2.0	31	39	46	31
	26-50	2	1	-	-	3.0	1.5				8		
	(Total)	(26)	(18)	(22)	(16)	(154.2)	(55.1)	(67.5)	(25.3)	(10024)	(3526)	(4084)	(1936)
O. T. Side	501-900	-	-	-	-	-	-	-	-	-	-	-	-
	151-500	22	17	24	9	58.4	37.0	44.7	15.6	2790	1587	1921	691
	51-150	11	2	3	2	14.7	3.0	4.6	16.0	145	67	91	166
	26-50	2		1	2	3.0		5.0	9.0	27		31	30
	(Total)	(35)	(19)	(28)	(13)	(76.1)	(40.0)	(54.3)	(40.6)	(2962)	(1654)	(2043)	(887)
Longline	151-500	-	1	1	1	-	2.0	2.0	1.0	-	64	33	19
	51-150	17	16	14	18	82.7	75.3	73.0	114.6	1296	1575	1592	2002
	26-50	7	6	6	12	25.9	16.6	30.0	59.0	246	252	490	781
	(Total)	(24)	(23)	(21)	(31)	(108.6)	(93.9)	(105.0)	(174.6)	(1542)	(1891)	(2115)	(2802)

TABLE 3. Seasonality of Canadian groundfish fisheries in Subarea 5. Landings and effort by month by main vessel category, 1969-72. (metric tons round).

Vessel category	Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Otter trawlers	1969	9	25	-	129	604	730	555	693	371	183	90	18	3,408
151-500 g.t.	1970	61	3	-	-	549	458	124	156	165	88	110	37	1,751
LANDINGS	1971	-	-	-	-	433	162	257	271	136	348	46	15	1,668
	1972	-	162	-	-	-	82	11	278	129	60	19	-	741
Otter trawlers	1969	230	177	-	369	1196	1475	962	1642	1273	1456	429	104	9,314
501-900 g.t.	1970	13	239	-	-	432	772	108	501	587	364	130	94	3,241
LANDINGS	1971	-	88	21	-	821	271	681	289	110	875	702	134	3,991
	1972	-	602	19	-	-	320	62	297	130	294	107	-	1,830
Otter trawlers	1969	42	54	-	231	958	1616	1249	1257	1094	520	340	68	7,529
151-500 g.t.	1970	176	9	-	-	1250	896	268	425	616	248	400	173	4,283
HRS.FISHED	1971	-	-	-	-	1202	393	748	749	428	924	142	31	4,636
	1972	-	391	-	-	-	+	53	664	359	116	27	-	1,791
Otter trawlers	1969	335	228	-	469	2168	2476	1609	2401	1855	1891	765	317	14,467
501-900 g.t.	1970	36	468	-	-	815	1218	288	973	1173	465	195	256	5,872
HRS. FISHED	1971	-	140	15	-	1572	775	1438	619	312	1316	1802	273	8,003
	1972	-	487	19	-	-	569	80	688	262	493	193	-	2,632
Longliners	1969	-	15	-	-	56	196	347	500	326	98	-	-	1,538
All tonnages	1970	-	-	-	32	69	292	366	444	373	52	47	-	1,676
LANDINGS	1971	-	-	-	-	38	523	705	500	261	88	-	-	2,115
	1972	-	2	-	-	42	458	1057	576	530	132	6	4	2,807

TABLE 4. Catch rates of Canadian otter trawlers in Subarea 5, 1969-72

Vessel category	Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Full Year
Otter trawlers	1969	219	456	-	559	630	452	444	552	339	353	265	209	453
151-500 g.t.	1970	349	311	-	-	440	511	463	367	268	355	276	212	409
kg/hr	1971	-	-	-	-	360	412	343	362	318	377	323	490	360
fished	1972	-	415	-	-	-	+	211	419	360	516	696	-	414
Otter trawlers	1969	688	779	-	787	552	596	598	684	686	770	561	328	644
501-900 g,t,	1970	369	510	-	-	530	634	375	516	501	783	666	368	552
kg/hr	1971	-	625	1373	-	522	350	474	467	351	665	390	491	499
fished	1972	-	1235	990	-	-	562	774	432	498	596	553	-	695

TABLE 5. Longline landings from Subarea 5 by species 1969-72

Species	1969	1970	1971	1972
Cod	721	683	867	1,774
Haddock	22	76	153	196
White hake	15	30	58	20
Cusk	691	805	1,002	751
Pollock	-	1	1	-
Halibut	66	50	20	30
Wolffish	-	1	14	10
Groundfish unsp.	23	30	-	26
Total	1,538	1,676	2,115	2,807

TABLE 6. Effort in Subarea 5 by Canadian otter trawlers of 151-500 gross tons, 1969-72

Year	Effort type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1969	Trips	0.3	0.6	-	1.9	10.2	14.4	12.2	13.0	9.5	5.1	4.0	1.1	72.3
	Days @ sea	4	5	-	20	81	133	110	107	92	44	37	11	646
	Days fished	3	4	-	16	69	116	91	90	80	38	29	11	548
	Hrs. fished	42	54	-	231	958	1616	1249	1257	1094	520	340	88	7,529
1970	Trips	1.1	1.0	-	-	11.2	7.7	2.1	3.9	5.4	2.1	2.5	1.3	38.3
	Days @ sea	11	7	-	-	100	70	20	33	48	19	28	13	343
	Days fished	11	2	-	-	86	59	18	29	43	17	25	13	293
	Hrs. fished	176	9	-	-	1250	896	268	425	616	248	400	173	4,283
1971	Trips	-	-	-	-	9.6	3.2	6.0	6.3	3.6	6.8	1.4	0.2	37.1
	Days @ sea	-	-	-	-	99	31	55	55	33	69	13	2	356
	Days fished	-	-	-	-	82	26	48	48	29	62	11	2	310
	Hrs. fished	-	-	-	-	1202	393	748	749	428	924	142	31	4,636
1972	Trips	-	4.1	-	-	-	1.0	0.4	5.8	1.8	2.6	0.3	-	16.0
	Days @ sea	-	40	-	-	-	+	4	48	25	17	3	-	152
	Days fished	-	31	-	-	-	+	3	41	25	15	2	-	129
	Hrs. fished	-	391	-	-	-	+	53	664	359	116	27	-	1,791

TABLE 7 Effort in Subarea 5 by Canadian otter trawlers of 501-900 gross tons, 1969-72

Year	Effort type	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1969	Trips	3.0	2.0	-	3.8	16.4	19.9	14.4	22.2	18.7	18.2	8.1	3.5	130.2
	Days @ sea	27	19	-	36	155	178	128	202	163	163	75	31	1,179
	Days fished	23	16	-	32	138	156	110	172	136	137	55	26	1,002
	Hrs. fished	335	228	-	469	2,168	2,476	1,609	2,401	1,855	1,891	765	317	14,467
1970	Trips	0.2	3.5	-	-	6.4	8.4	2.1	7.7	9.9	3.7	1.7	1.9	45.5
	Days @ sea	2	34	-	-	58	82	20	72	82	48	16	17	425
	Days fished	2	31	-	-	53	70	17	57	74	37	13	16	364
	Hrs. fished	36	468	-	-	815	1,218	288	973	1,173	465	195	256	5,872
1971	Trips	-	1.9	0.2	-	11.6	5.0	9.6	4.9	2.2	10.7	13.0	1.4	60.5
	Days @ sea	-	14	2	-	114	50	94	47	22	99	126	18	577
	Days fished	-	13	2	-	102	47	88	41	19	89	112	18	522
	Hrs. fished	-	140	15	-	1,572	775	1,438	619	312	1316	1,802	273	8,003
1972	Trips	-	4.1	0.2	-	-	4.1	1.1	4.4	1.9	4.3	1.6	-	21.7
	Days @ sea	-	39	2	-	-	37	9	42	17	41	12	-	198
	Days fished	-	33	2	-	-	36	8	41	15	36	12	-	179
	Hrs. fished	-	487	19	-	-	569	80	688	262	493	193	-	2,632

TABLE 8. Canadian trawl fishery in Subarea 5. Ratio of days fished and hours fished to days at sea, by tonnage class, 1969-72 (Records based on 20 or less reported days at sea are in parentheses.)

Tonnage	Effort	Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
151-500	Days fished	1969	(0.75)	(0.80)	-	(0.80)	0.85	0.87	0.83	0.84	0.87	0.86	0.78	(1.00)	0.85
		1970	(1.00)	(0.29)	-	-	0.86	0.84	(0.90)	0.88	0.90	(0.89)	0.89	(1.00)	0.85
		1971	-	-	-	-	0.83	0.84	0.87	0.87	0.88	0.90	(0.85)	(1.00)	0.87
		1972	-	0.78	-	-	-	-	(0.75)	0.85	1.00	(0.88)	(0.67)	-	0.85
501-900	Days fished	1969	0.85	(0.84)	-	0.89	0.89	0.88	0.86	0.85	0.83	0.84	0.73	0.84	0.85
		1970	(1.00)	0.91	-	-	0.91	0.85	(0.85)	0.79	0.90	0.77	(0.81)	(0.94)	0.86
		1971	-	(0.93)	(1.00)	-	0.89	0.94	0.94	0.87	0.86	0.90	0.89	(1.00)	0.90
		1972	-	0.85	(1.00)	-	-	0.97	(0.89)	0.98	(0.88)	0.88	(1.00)	-	0.90
151-500	Hrs. fished	1969	(10.5)	(10.8)	-	(11.6)	11.8	12.2	11.4	11.7	11.9	11.8	9.2	(8.0)	11.7
		1970	(16.0)	(1.3)	-	-	12.5	12.8	(13.4)	12.9	12.8	(13.1)	14.3	(13.3)	12.5
		1971	-	-	-	-	12.1	12.7	13.6	13.6	13.0	13.4	(10.9)	(15.5)	13.0
		1972	-	9.8	-	-	-	-	(13.3)	13.8	14.4	(6.8)	(9.0)	-	11.8
501-900	Hrs. fished	1969	12.4	(12.0)	-	(13.0)	14.0	13.9	12.6	11.9	11.4	11.6	10.2	10.2	12.3
		1970	(18.0)	13.8	-	-	14.1	14.9	(14.4)	13.5	14.3	9.7	(12.2)	(15.1)	13.8
		1971	-	(10.0)	(7.5)	-	13.8	15.5	15.3	13.2	14.2	13.3	14.3	(15.2)	13.9
		1972	-	12.5	(9.5)	-	-	15.4	(8.9)	16.4	(15.4)	12.0	(16.1)	-	13.3