

Flatfish 4VWX
Update of the status in 1979 of: American plaice
Yellowtail flounder, Witch flounder, Winter flounder,
Atlantic halibut and Greenland halibut

by

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Abstract

Landings from Quebec, Newfoundland and the Maritimes were analyzed for 1979 for Plaice, Yellowtail, Winter and Witch flounders. Commercial catch per unit of effort indices (catch in kilograms per hour) using the Chikuni index for otter trawlers tonnage class 4 (150-500) were also calculated. These, as well as research CPUE, indicate that although there is evidence of stock fluctuations, the total biomass is relatively stable and will continue to support the present fishing pressure.

Résumé

Les débarquements de plie canadienne, de limande à queue jaune, de plie rouge et de plie grise, compilés pour le Québec, Terre-Neuve et les Maritimes en 1979, ont été analysés. Les prises par unité d'effort de la flotte commerciale (en kilogrammes par heure) ont également été calculées en utilisant l'indice de Chikuni pour les chalutiers de classe de tonnage 4 (150-500). Ces données, de même que les prises par unité d'effort de navires de recherche, indiquent que, même si les stocks montrent des signes de fluctuations, la biomasse totale est relativement stable et continuera de supporter la pression de pêche actuelle.

Introduction

The flatfish species which are commercially fished on the Scotian Shelf are witch flounder (Glyptocephalus cynoglossus (L)), American plaice (Hippoglossoides platessoides (Fabricius)), yellowtail flounder (Limanda ferruginea (Storer)), winter flounder (Pseudopleuronectes americanus (Walbaum)), Atlantic halibut (Hippoglossus hippoglossus (L)) and Greenland halibut (Reinhardtius hippoglossoides (Walbaum)).

Nominal catches in 1978-1979 of the flatfish on the Scotian Shelf were made predominantly by Canadian otter trawlers and Danish seiners. The flatfish fishery by otter trawlers is mainly a by-catch fishery.

The USSR has made sporadic, large landings during 1965-1977 (Halliday 1973).

Commercial sampling for the flatfish is restricted to American plaice, witch flounder, yellowtail flounder and winter flounder (Table 1). The detailed history of the paucity of sampling is presented in Cleary (1979). Samples for 1979 are available for otter trawlers and Danish seiners for American plaice and witch flounder in 4V. One sample of winter flounder was taken but none of the fish in the sample were aged.

Canadian research cruises in the summer months provide information for American plaice, witch and yellowtail flounders. Other flatfish species are only occasionally caught, therefore data for these species are quite sporadic.

This paper presents an update in the landings and abundance indices of the flatfish stocks. Basic data are scarce for most species and any detailed assessment of these stocks would be futile. Detailed information on abundance indices is provided for American plaice, witch and yellowtail flounder.

AMERICAN PLAICE

(i) Research vessel CPUE

Research vessel CPUE in Division 4V is calculated from cruises during 1970-1979 by taking the total number of plaice by sex per standardized tow. For both male and female plaice, CPUE values were highest in 1976 and show a decline afterwards. This indicates a decline in population abundance since 1975.

(ii) Nominal catches

Catches since 1970 for American plaice on the Scotian Shelf have averaged 10,600 t. The peak catch was recorded in 1974 with 16,772 t. A decline since then is evident and catches in 1978 and 1979 (Table 2) were the lowest in the decade, ranging from 6,200-6,800 t.

Canadian otter trawlers took 78% of the total catch of 4V plaice in 1979, with side otters taking 34% and stern otter trawlers 44% (Table 3).

High catches of 4V plaice are recorded during the early summer months in most recent years (Table 4) by Canadian vessels. The USSR between 1970-1976 landed most of their catch between June and September.

(iii) Length and age composition of commercial landings from 4V

Commercial landings were converted to numbers caught at age using the available samples for 1979. Sexes were prorated according to the sex ratio in the commercial samples. Tables 5 and 6 indicate that American plaice begin to recruit at age 5-6. Removals in 1979 had a similar age composition to those in 1978. There is no evidence of a large year-class coming into the fishery.

Weights-at-age for plaice caught by otter trawlers in Division 4V are given in Table 7. These weights were used to get the number of fish landed.

(iv) Commercial CPUE for 4V

Catch per unit of effort for plaice was calculated using Canadian side otter trawlers of 150-500 gross tons, catch and effort data (Cleary 1979). The Chikuni index shows a decline since 1972 and a small increase in 1977-1979, indicating a small increase in population abundance since 1977 (Table 8a).

WITCH FLOUNDER

(i) Research vessel CPUE

Research vessel catch per unit effort was calculated from numbers per standardized tow 1970-1979 in Division 4VW. Total numbers of male witch flounder per tow reached the highest number in 1974, with a decline in 1975-1979. Total numbers of females per tow showed the same trend, the highest numbers in 1974 and with a decline from 1975-1977.

Total population estimates made from research cruises in 4VWX for separate sexes, as well as sexes combined, (Table 8b) demonstrate a decline between 1975-1979.

(ii) Nominal catches

Peak landings of witch flounder occurred in 1968 and 1971 in 4VWX with 21,682 and 17,864 t respectively (Table 9). Since 1971, a decline occurred and the nominal catch for 1979 is only 10% of the high catch in 1971. Most of the Canadian landings were reported in the spring months in 4V and the USSR's landings were concentrated in 4W during the summer months (Cleary 1979).

Nominal catches for 1979 are the lowest recorded. No foreign catches were reported in 1979.

(iii) Commercial CPUE

Chikuni CPUE indices were calculated for 4VW as an index of population abundance (Cleary 1979). The highest Chikuni CPUE index was recorded in 1972. A decline in the witch flounder population abundance is evident from these indices during 1973-1979 (Table 8b).

(iv) Length and age composition of commercial landings for 4VW

Numbers-at-age in 1979 for 4VW male witch flounder (Table 10) and female witch flounder (Table 11) did not change greatly since 1978.

YELLOWTAIL FLOUNDER

(i) Research vessel CPUE

Abundance indices from research cruises were calculated for 1970-1979 in 4VWX. The highest total number per tow was obtained in 1977 for both sexes separately.

The data imply that between 1970-1976 a slight population increase occurred, and from 1976-1979 a decrease in abundance occurred in the yellowtail flounder population (Table 8c).

(ii) Nominal catches

A breakdown of landings for yellowtail flounder by NAFO Division 4V, 4W and 4X is available since 1963 (Table 12). Landings in 4V have been the highest, with 4W next and 4X last in importance. Nominal catches fluctuated between 4,000-5,000 t between 1963-1967 until a peak of 13,000 t was reached in 1968. Since 1969, landings have decreased from approximately 4,000 t to a low of 904 t in 1976. Between 1977-1979 an increase in landings from 1,400 to 2,000 t occurred.

(iii) Commercial CPUE

Commercial catch per unit of effort indices were calculated in the same manner as the CPUE for witch flounder and plaice. The resulting data are found on Table 8c. Due to insufficient data for 1970, 1971, and 1976 to apply a regression line, the points are omitted. The CPUE indices indicate a decline in abundance since 1972 but a stabilization of population abundance during 1977-1979.

No commercial samples were taken of yellowtail flounder during 1979 for NAFO areas 4VX.

WINTER FLOUNDER

Nominal catches (Table 13) were divided by NAFO Divisions. The total catch for 1979 declined from 1978. A gradual decrease in catch was evident since 1975.

ATLANTIC HALIBUT

Nominal catches have ranged from 500-1,500 during 1963-1978 (Table 14). The commercial catch in 1979 was twice the amount in 1978.

GREENLAND HALIBUT

Greenland halibut, or turbot, landings are negligible from 1963-1976, the largest landings being 69 t in 1976 (Table 15). In 1977 and 1978 landings increased to 215 t and 452 t respectively; in 1979 the total turbot landed from all areas was 27 tonnes.

Total flatfish

Landings of plaice, witch, yellowtail, and winter flounder catches are shown Figure 1. The combined CPUE index, calculated for January, February, March and April for side trawler of 150-500 gross tons, indicates a small decrease in catch rate from 1969-1975, followed by a more stable phase from 1975-1979.

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References

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Table 1.

SAMPLING SUMMARY SCOTIAN SHELF FLATFISH

YEAR	WINTER FLOUNDER		WITCH		A. PLAICE		YELLOWTAIL		TOTAL SAMPLES
	Samples	Aged	Samples	Aged	Samples	Aged	Samples	Aged	
1979	1	0	13	13	9	9	0	0	23
1978	1	0	12	12	11	11	4	4	28
1977	1	1	12	11	16	15	6	6	35
1976	3	3	7	7	10	10	-	-	20
1975	-	-	9	9	5	5	1	1	15
1974	-	-	6	6	4	4	1	1	11
1973	1	1	4	4	4	4	1	1	10
1972	-	-	4	4	4	4	1	1	9
1971	-	-	5	5	3	3	-	-	8
1970	-	-	5	5	3	3	-	-	8
1969	-	-	3	0	1	1	1	0	5
1968	-	-	6	0	3	3	4	4	13
1967	-	-	4	0	4	2	3	3	11
1966	-	-	5	0	1	0	3	3	9
1965	1	0	7	0	-	-	2	0	10
1964	-	-	5	1	-	-	2	1	7
1963	-	-	6	3	2	0	-	-	8
1962	1	0	3	0	-	-	4	0	8
1961	1	0	-	-	-	-	-	-	1
1960	-	-	1	0	-	-	-	-	1
1959	-	-	-	-	-	-	-	-	-
1958	-	-	-	-	-	-	1	0	1
1957	-	-	-	-	-	-	-	-	-
1956	-	-	2	1	-	-	-	-	2
1955	2	2	2	1	-	-	-	-	4
1954	3	2	1	0	-	-	-	-	4
1953	6	6	3	3	-	-	1	1	10
1952	4	4	5	4	2	2	1	1	12
1951	6	5	3	3	4	4	2	1	15
1950	5	4	2	0	-	-	3	0	10
1949	5	4	1	1	2	1	7	1	15
1948	5	0	4	4	6	0	7	7	22

Table 2. American Plaice landings (t) for the Scotian Shelf (1963-79).

YEAR	4V	4W	4X	TOTAL
1963	1376	683	250	2309
1964	1967	603	512	3082
1965	4707	2797	694	8198
1966	8167	5313	726	14206
1967	8884	780	1106	10770
1968	10489	7830	946	19265
1969	8076	4789	870	13735
1970	5242	2481	635	8358
1971	7765	5991	545	14301
1972	6912	3175	566	10653
1973	8686	3407	339	12432
1974	11363	4951	458	16772
1975	7336	4115	296	11747
1976	8488	2350	309	11147
1977	6716	592	449	7757
1978 1	5469	824	522	6815
1979 1	4878	476	815	6169

1) Provisional NAFO statistics

Table 3. American Plaice catch (t) by gear for all countries for NAFO Division 4V.

Year	Trawlers			Danish Seine		Longline		Others		Total	
	Side (OTB1)	Stern (OTB2)	Total ¹								
1972	3012 (48%)	3267 (52%)	6279 (91%)	364 (5%)	189 (3%)	80 (1%)	6912 (100%)				
1973	1971 (26%)	5909 (74%)	7958 (92%)	482 (6%)	152 (1%)	94 (1%)	8686 (100%)				
1974	2193 (21%)	8318 (79%)	10511 (92%)	510 (5%)	125 (1%)	217 (2%)	11363 (100%)				
∞ 1975	2779 (45%)	3455 (55%)	6234 (85%)	657 (9%)	171 (2%)	274 (4%)	7336 (100%)				
1976	2438 (34%)	4678 (66%)	7116 (84%)	1178 (14%)	87 (1%)	107 (1%)	8488 (100%)				
1977	2661 (54%)	2285 (46%)	4951 (74%)	1443 (21%)	218 (3%)	104 (2%)	6716 (100%)				
1978 ²	1759 (45%)	2127 (55%)	3886 (71%)	1147 (21%)	163 (3%)	263 (5%)	5459 (100%)				
1979 ²	1638 (34%)	2136 (44%)	3801 (78%)	806 (16%)	193 (4%)	78 (2%)	4878 (100%)				

¹Includes other trawler's landings

²Provisional NAFO statistics

Table 4. American Plaice landings (t) by month and country for NAFO Division 4V (1970-79).

YEAR	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL ¹
<u>CANADA</u>													
1970	1062	845	967	185	312	271	162	47	200	161	244	573	5029
1971	985	950	887	1001	620	207	224	141	250	96	252	714	6327
1972	712	776	1161	1007	810	215	206	123	111	68	166	268	5623
1973	919	620	226	619	388	169	303	120	56	43	93	677	4233
1974	523	914	1760	775	794	423	274	107	71	55	115	401	6212
1975	621	599	1544	545	844	296	333	275	188	135	118	255	5753
1976	423	481	1137	968	459	382	626	350	319	304	377	343	6169
1977	446	529	432	592	1120	829	1045	724	173	172	503	136	6701
1978 ²	38	429	363	870	1092	686	889	318	176	263	223	125	5469
1979 ²	160	239	549	571	531	427	595	321	193	272	370	650	4878
<u>USSR</u>													
1970	-	-	-	-	-	-	-	-	79	-	113	-	192
1971	-	14	6	9	389	47	498	169	194	81	13	-	1420
1972	-	-	120	-	6	56	83	280	464	145	-	-	1154
1973	-	-	-	-	531	96	77	2644	1013	14	-	-	4375
1974	597	-	-	-	-	812	722	1254	920	780	-	-	5085
1975	14	25	38	125	114	132	199	201	213	201	126	134	1522
1976	35	65	74	62	109	72	142	57	304	494	316	402	2132
1977	-	-	-	-	-	-	-	-	-	-	-	-	-
1978 ²	-	-	-	-	-	-	-	-	-	-	-	-	-
1979 ²	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>TOTAL³</u>													
1970	1062	845	968	187	312	271	166	47	286	161	364	573	5242
1971	988	966	906	1010	1009	254	722	310	444	177	265	714	7765
1972	718	782	1379	1010	827	271	289	403	575	220	166	272	6912
1973	932	628	283	619	919	265	380	2764	1069	57	93	677	8686
1974	1124	974	1760	775	794	1235	996	1363	991	835	115	401	11363
1975	646	643	1596	670	958	438	532	476	401	336	251	389	7336
1976	459	546	1279	1030	568	454	768	407	623	898	693	763	8488
1977	446	532	432	592	1120	829	1045	724	173	172	503	148	6716
1978 ²	38	426	363	870	1092	686	889	318	176	263	223	125	5469
1979 ²	160	239	549	571	531	427	595	321	193	272	370	650	4878

¹ Includes NK months of the year² Provisional NAFO statistics³ Includes France, Japan and Poland

Table 5. Catch-at-age ($\times 10^{-3}$) of females American plaice in 4V (1970-1979).

Age	1970	1971	1972	1973	1974	1975	1976	1977	1978 ¹	1979
3	0	0	0	0	0	0	0	2	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	12	3	16
6	0	0	0	186	0	127	23	114	67	87
7	21	0	117	232	52	66	30	359	149	431
8	8	69	624	565	248	544	107	671	260	231
9	132	135	818	200	720	1382	427	592	412	269
10	33	0	1254	354	843	1195	534	1212	400	214
11	103	104	723	503	1077	526	1243	1147	636	291
12	174	334	472	499	756	655	750	924	897	627
13	224	304	346	252	640	365	820	803	817	560
14	0	480	68	197	478	291	607	535	373	370
15	207	293	206	275	497	365	228	379	312	249
16	609	1157	620	1604	1038	71	266	87	271	105
17	302	435	0	0	334	91	183	50	200	53
18	0	0	0	0	0	18	246	50	94	23
19	0	0	0	0	0	36	141	25	65	13
20	0	0	0	0	0	18	120	19	43	17
21	0	0	0	0	0	0	77	23	17	0
22	0	0	0	0	0	18	57	17	18	4
23	0	0	0	0	0	0	26	1	12	2
24	0	0	0	0	0	0	26	2	8	0
25	0	0	0	0	0	0	0	0	6	0
26	0	0	0	0	0	0	0	0	14	5

¹Cleary (unpublished data 1979) recalculated 1970-1978

Table 6. Catch-at-age ($\times 10^{-3}$) of males American plaice in 4V (1970-1979).

Age	1970	1971	1972	1973	1974	1975	1976	1977	1978 ¹	1979
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	22	0	0	0	0
5	0	0	0	0	9	74	6	36	1	59
6	31	111	157	84	105	25	25	66	71	128
7	444	312	88	552	342	445	131	232	95	363
8	1130	591	601	665	993	1337	240	363	143	567
9	445	466	1453	640	1191	1152	581	714	362	521
10	373	573	651	749	1041	1183	758	447	401	543
11	142	282	388	272	759	430	1762	945	494	385
12	208	286	237	373	876	194	1130	505	245	246
13	242	44	394	275	337	29	714	265	260	220
14	0	277	0	224	139	37	405	78	128	63
15	124	132	13	876	199	0	113	15	107	23
16	40	97	13	622	51	0	45	1	70	6
17	85	101	0	0	23	0	14	0	24	3
18	0	0	0	0	0	0	35	0	12	0
19	0	0	0	0	0	0	31	0	0	0
20	0	0	0	0	0	0	3	0	12	0
21	0	0	0	0	0	0	2	0	0	0
22	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0

¹Cleary (unpublished data 1979) recalculated 1970-1978

Table 7. Commercial weight (kg) at age of American Plaice caught by otter trawler in ICNAF division 4V.

AGE	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Male										
4	0.19	0.19		0.19	0.19	0.19				
5	0.28	0.25	0.28	0.28	0.28	0.26		0.15	0.17	0.17
6	0.36	0.35	0.36	0.34	0.35	0.32	0.38	0.25	0.22	0.22
7	0.33	0.29	0.36	0.29	0.31	0.29	0.34	0.34	0.27	0.24
8	0.45	0.47	0.41	0.37	0.37	0.34	0.36	0.41	0.38	0.29
9	0.45	0.45	0.45	0.44	0.43	0.41	0.38	0.43	0.41	0.38
10	0.52	0.54	0.50	0.49	0.47	0.43	0.43	0.48	0.45	0.45
11	0.53	0.55	0.53	0.44	0.44	0.44	0.44	0.46	0.49	0.58
12	0.78	0.80	0.74	0.79	0.84	0.79	0.52	0.55	0.58	0.58
13	0.62	0.62	0.62	0.62	0.62	0.62	0.56	0.60	0.56	0.69
14	0.86	0.85	0.79	0.91	0.84	0.86	0.72	0.71	0.72	1.02
15	-	-	-	-	-	-	0.98	0.55	0.92	1.33
16	-	-	-	-	-	-	2.44	1.24	1.10	1.22
17	-	-	-	-	-	-	1.43	1.14	1.12	1.48
18	-	-	-	-	-	-	0.57	-	1.28	-
19	-	-	-	-	-	-	0.53	-	-	-
20	1.40	1.40	-	-	-	-	-	-	-	-
Female										
5	-	-	-	-	-	-	-	0.19	-	0.16
6	0.32	0.29	0.36	0.32	0.31	0.32	0.38	0.40	0.27	0.35
7	0.34	0.34	0.34	0.34	0.34	0.34	-	0.63	0.41	0.33
8	0.44	0.41	0.45	0.43	0.42	0.42	0.45	0.56	0.40	0.50
9	0.50	0.54	0.56	0.50	0.50	0.47	0.53	0.56	0.52	0.54
10	0.67	0.83	0.74	0.69	0.69	0.61	0.64	0.65	0.59	0.68
11	0.84	0.90	0.82	0.79	0.82	0.70	0.64	0.74	0.64	0.80
12	0.79	0.87	0.79	0.78	0.80	0.76	0.71	0.82	0.79	0.87
13	1.21	1.23	1.07	1.19	1.15	1.15	0.88	0.97	0.82	1.02
14	1.07	1.06	1.06	1.02	1.04	0.86	0.94	0.96	1.05	1.10
15	1.42	1.36	1.20	1.42	1.37	1.32	1.52	1.07	1.05	1.49
16	1.69	1.59	1.31	1.65	1.72	1.73	1.01	1.45	1.29	1.69
17	1.91	1.78	1.58	1.94	1.77	1.76	1.89	1.41	1.20	2.01
18	1.58	1.58	1.32	1.58	1.58	1.58	1.43	1.77	1.66	2.63
19	1.64	1.51	1.58	1.68	1.57	1.63	1.75	1.52	1.68	1.73
20	1.58	1.58		1.58	1.58	1.58	1.67	1.74	1.54	1.99
21	-	-	-	-	-	-	1.95	1.72	1.73	-
22	2.44	2.44	-	2.44	2.44	2.44	2.00	1.95	2.53	3.21
23	2.32	2.32	-	2.32	2.32	2.32	2.14	-	1.70	3.10
24	-	-	-	-	-	-	2.10	2.71	2.15	-
25	-	-	-	-	-	-	-	-	2.77	-
26	-	-	-	-	-	-	3.32	-	3.25	2.52

Table 8a. A. plaice research and commercial catch per unit of effort in NAFO Division 4V, 1970-1979.

	1970	1971	1972	1973	1974	1975	1976	1977	1978 ²	1979 ²
Canadian side trawler t/hr	-	-	.614	.343	.342	.288	.215	.295	.296	.356
Research summer cruise no/tow	80.27	79.11	69.64	40.62	95.17	60.50	127.79	58.99	26.77	56.84

Table 8b. Witch flounder research and commercial catch per unit of effort in NAFO Division 4VW, 1970-1979.

Canadian side trawler t/hr	-	-	.431	.304	3.15	.231	.190	.183	-	.231
Research summer cruise no./tow	5.13	5.92	4.23	9.13	18.39	5.55	3.08	3.52	3.12	1.556

Table 8c. Yellowtail research and commercial catch per unit of effort in NAFO 4VWX, 1970-1979.

Canadian side trawler t/hr ¹	-	-	.550	.210	.190	.210	-	.200	.210	.296
Research summer cruise no./tow	20.00	17.17	18.43	19.01	25.56	30.71	19.18	49.95	12.64	26.96

¹ Actual numbers not available, estimated from Cleary,(1979) for years 1972-78.

² Provisional NAFO statistics

Table 9. Witch Flounder landings (t) for the Scotian Shelf (1963-79).

<u>Year</u>	<u>4V</u>	<u>4W</u>	<u>4X</u>	<u>TOTAL</u>
1963	4971	2440	75	7486
1964	5808	2564	257	8629
1965	5068	7454	421	12943
1966	5241	9047	224	14512
1967	5740	1693	383	7816
1968	7598	13349	735	21682
1969	4338	8963	792	14093
1970	3282	1959	807	6048
1971	5640	11083	1141	17864
1972	4894	5759	698	11351
1973	6572	6862	535	13969
1974	4913	2004	498	7415
1975	3284	5307	331	8922
1976	2718	2683	341	5742
1977 ¹	1555	455	421	2431
1978	1528	463	188	2179
1979 ¹	1248	198	264	1710

¹ Provisional NAFO statistics

Table 11. 4VW Witch Female, Removals at age ($\times 10^{-3}$)

Age	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
5	20	16	60	0	0	3	0	1	8	1
6	104	106	166	408	19	0	20	3	24	26
7	573	578	911	681	203	0	18	12	80	100
8	600	2030	2248	2196	293	456	69	10	98	48
9	420	2190	1654	1205	457	405	0	14	120	150
10	837	2299	836	2631	663	836	181	117	43	120
11	638	2434	1303	1066	526	1333	142	66	317	67
12	424	1809	1240	1482	519	1244	433	252	263	212
13	318	802	309	1288	652	726	311	298	295	151
14	103	857	276	1035	712	691	304	261	387	314
15	0	319	0	501	1108	690	391	195	340	445
16	158	723	216	897	890	564	402	165	159	123
17	37	389	0	0	138	627	316	303	200	54
18	0	0	0	0	19	268	352	83	157	176
19	0	0	0	0	0	122	158	108	87	71
20	0	0	0	0	0	88	149	70	77	4
21	0	0	0	0	0	39	68	22	60	0
22	0	0	0	0	0	120	41	43	13	17
23	0	0	0	0	0	2	1	12	5	0
24	0	0	0	0	0	0	6	17	27	8
25	0	0	0	0	0	0	37	9	5	26
26+	0	0	0	0	0	0	62	22	20	17

Table 12. Yellowtail flounder landings (t) for the Scotian Shelf (1963-79).

YEAR	4V	4W	4X	TOTAL
1963	1740	2148	84	3972
1964	4084	1165	150	5399
1965	4330	1550	224	6104
1966	3521	1164	166	4851
1967	3808	1163	225	5196
1968	6953	5970	205	13128
1969	2491	1134	201	3826
1970	670	2686	326	3682
1971	889	668	218	1775
1972	697	624	164	1485
1973	980	394	139	1513
1974	573	130	236	939
1975	1101	254	213	1568
1976	473	201	230	904
1977	1101	40	302	1443
1978 ¹	1076	158	387	1621
1979 ¹	1588	115	289	1992

¹Provisional NAFO statistics

Table 13. Winter Flounder landings (t) for the Scotian Shelf (1963-79).

<u>YEAR</u>	<u>4V</u>	<u>4W</u>	<u>4X</u>	<u>TOTAL</u>
1963	17	65	614	696
1964	12	19	1280	1311
1965	32	179	1128	1339
1966	55	34	1257	1346
1967	37	5	902	944
1968	10	28	1143	1181
1969	4	12	1400	1416
1970	8	44	1478	1530
1971	237	1364	1483	3084
1972	78	551	825	1454
1973	480	655	774	1909
1974	777	1005	974	2756
1975	179	525	670	1374
1976	235	345	717	1297
1977	226	9	1024	1259
1978 ¹	185	146	877	1208
1979 ¹	228	13	844	1085

¹ Provisional NAFO statistics

Table 14. Atlantic Halibut landings (t) for the Scotian Shelf (1963-79)

Year	4V	4W	4X	TOTAL
1963	214	479	840	1533
1964	332	358	861	1551
1965	486	458	665	1609
1966	532	313	331	1176
1967	380	322	546	1248
1968	250	363	604	1217
1969	192	431	441	1064
1970	115	349	366	830
1971	231	360	414	1005
1972	178	216	456	850
1973	147	226	401	774
1974	124	127	404	655
1975	114	159	376	649
1976	144	148	422	714
1977	51	177	448	676
1978 ¹	220	278	3	501
1979 ¹	216	356	629	1201

¹ provisional NAFO statistics

Table 15: Turbot landings (t) for the Scotian Shelf (1963-79).

Year	4V	4W	4X	Total
1963	0	0	0	0
1964	1	0	1	2
1965	0	0	0	0
1966	1	0	0	1
1967	2	0	0	2
1968	10	0	0	10
1969	36	0	3	39
1970	14	3	3	20
1971	19	2	3	24
1972	11	0	7	18
1973	10	1	1	12
1974	35	0	0	35
1975	27	2	0	29
1976	57	6	6	69
1977	197	9	9	215
1978 ¹	-	-	-	452
1979 ¹	-	-	-	27

¹Provisional NAFO statistics

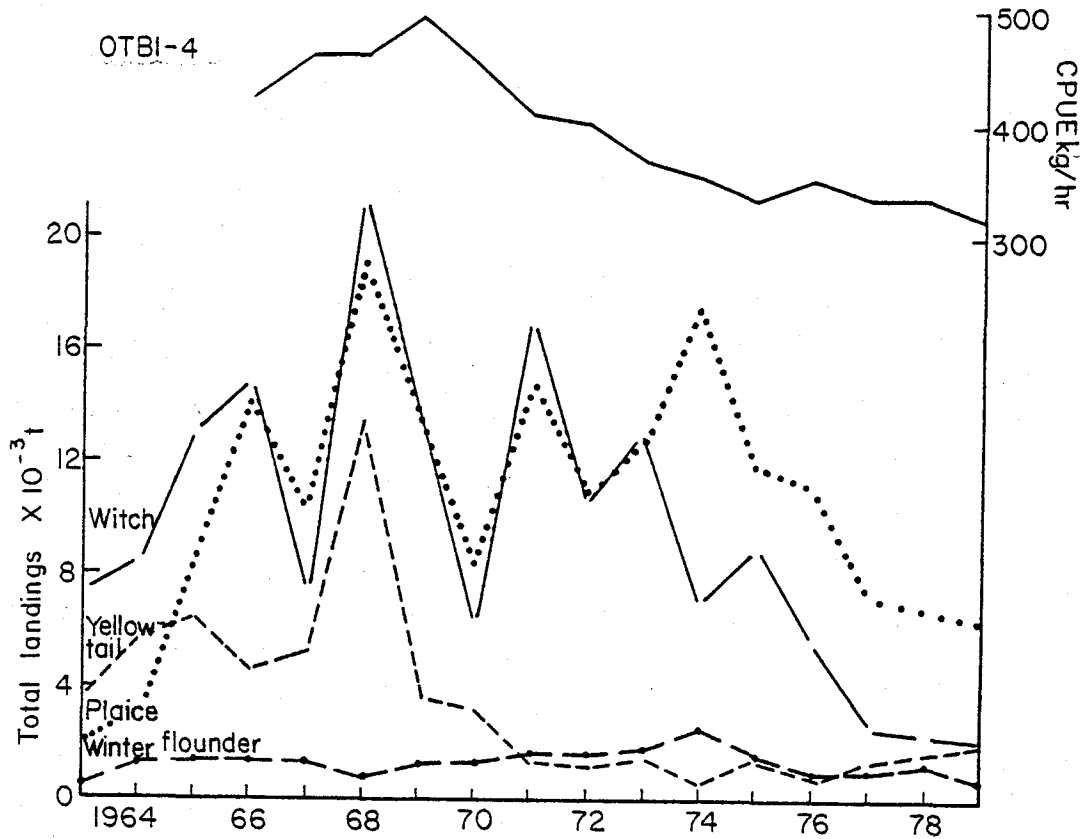


Fig. 1. Total landings for Scotian Shelf flatfish (omitting Greenland and Atlantic halibut) with combined CPUE.