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A Review of the Status of the 4VWX, 3NOPs Halibut Stocks

by

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Abstract

This is the first assessment of Atlantic halibut for the new management unit 4VWX&3NOPs defined in 1987. Due to an absence of commercial fishery samples, a full analytical assessment was not undertaken. The precautionary TAC of 3,200 t remained in effect for the 1992 fishery as did the minimum size (81 cm) regulation. The domestic landings since 1988 have been below the TAC with a 1,931 t shortfall in 1992, with all gear sectors below their allocation, except the < 65 ft. mobile gear fleet by-catch fishery. 3NOPs foreign landings increased significantly in 1991 but data are not yet available for the 1992 fishery. Small longliners account for over 70% of the landings and commercial catch rates for this fleet on the Scotian Shelf have declined since 1981 while catch rates on the southern Grand Banks increased to 1988, followed by a decline to 1992. Research surveys indicate a modest increase in abundance since the mid 1980s. However because the surveys generally catch halibut less than 75 cm, the increase in abundance may be an indicator of future recruitment rather than fishable biomass. Overall, the decrease in landings, and declining commercial catch rates would suggest that the Atlantic halibut stock size is decreasing and that the current TAC is too high.

Résumé

La présente évaluation du flétan de l'Atlantique est la première réalisée dans la nouvelle unité de gestion 4VWX&3NOPs, définie en 1987. Il ne s'agit pas d'une évaluation analytique exhaustive, en raison de l'absence d'échantillons de prises commerciales. Le TPA préventif de 3 200 t est resté en vigueur en 1992, comme d'ailleurs la taille minimale réglementaire (81 cm). Depuis 1988, les débarquements canadiens sont inférieurs au TPA. L'écart était de 1 931 t en 1992, toutes les flottilles n'ayant pas pêché la totalité de leur allocation, sauf pour ce qui est de l'allocation de prises accidentelles de la flottille de bateaux de pêche aux engins mobiles de moins de 65 pi. Les débarquements des navires étrangers dans 3NOPs ont augmenté considérablement en 1991, mais on ne dispose pas encore de données sur ceux de 1992. Les petits palangriers ont capturé plus de 70 % des débarquements; les taux de prises commerciales de cette flottille sur le plateau néo-écossais ont chuté depuis 1981, tandis qu'au sud des Grands Bancs les taux de prises ont augmenté en 1988, pour diminuer ensuite en 1992. Les relevés de recherche dénotent une modeste augmentation de l'abondance depuis le milieu des années 1980. Toutefois, comme les flétans généralement capturés dans ces relevés ont moins de 75 cm, la hausse de l'abondance s'applique peut-être davantage au recrutement futur qu'à la biomasse exploitable. Dans l'ensemble, la baisse des débarquements et des taux de prises commerciales semble indiquer que le stock de flétan de l'Atlantique diminue et que le TPA actuel est trop élevé.

Introduction

This document presents the first assessment of Atlantic Halibut for the new management unit 4VWX 3NOPs. This redefinition of the management unit was based largely on tagging results presented by Neilson *et al.* (1987) and Stobo *et al.* (1988) which indicated that Atlantic Halibut move extensively throughout most of the Canadian North Atlantic with small fish <75 cm moving further than larger fish. Migrations of larger fish were thought to be related to spawning. This extensive movement suggested that a single area was the most feasible management unit for Atlantic halibut, encompassing the Scotian Shelf (4VWX) and the southern Grand Banks (3NOPs).

Recent studies by Neilson *et al* (1993) suggest that peak spawning of Atlantic halibut occurs in the November/December period rather than the spring as previously documented (McCracken 1958; Kohler 1967). The study also indicated that immature fish typically occur off the southwestern Scotian Shelf but much less frequently off Newfoundland thus adding support to the view that the Scotian Shelf, especially the Browns Bank area, may be an important rearing area for juvenile halibut.

Atlantic halibut is the most highly valued groundfish species occurring in the North Atlantic. Prior to 1988 no TAC advice was given. However, with the increasing significance of the fishery both in landings and in value throughout the 1980s, a precautionary TAC of 3,200 t was established based largely on recent catch levels. A declining longline catch rate series was noted as well.

After the Groundfish Management plan was announced in 1987, an Atlantic Groundfish Advisory Committee (AGAC) industry working group was formed to look at management alternatives for the 1988 halibut fishery. The working group felt that a minimum size limit would provide a means of restricting the harvesting of juvenile halibut thereby allowing for increased growth and subsequent harvest at a larger size and weight thus optimizing both catches and revenues. A second benefit of the minimum size regulation would be a potential increase in the number of spawners if the released immature fish live to reach sexual maturity. An 81 cm size limit had been in effect for Pacific halibut since 1973. In the absence of focused halibut research and owing to similar characteristics between the east and west coast halibut it was felt that an 81 cm size limit would be an appropriate interim measure on the east coast (Anon. 1987).

To assess the effectiveness of the proposed minimum size limit in North Atlantic waters, the survival of halibut caught in longline or trawl gear was examined, (Neilson *et al.* 1989). The results of this study indicated that for halibut less than the proposed size limit, 35% of the otter trawl catch and 77% of the longline catch survived more than 48 hr. As well, the effect of the minimum size regulation on yield and value per recruit was examined, (Neilson *et al.* 1989). The model indicated that under most scenarios, the size limit did not result in increased yield. In general, yield per recruit was more sensitive to fishing mortality than to age of first entry to the fishery. If prices for over 81 cm halibut were higher than for smaller fish the loss in yield could be offset by the increased value of the landings. Based on industry requests, a minimum size limit for halibut has been in effect since 1988 although not enforced until 1990.

Description of the Fishery

Halibut landings declined from 3274 t in 1961 to 1059 t in 1976 (Table 1, Fig. 1). Between 1977 and 1985, landings increased steadily to a high of 4031 t. Since 1985 total landings have declined to 2168 t in 1991. Overall figures for 1992 are unavailable due to unreported foreign landings. However foreign landings especially in 3N have increased considerably (Table 2, Fig. 2) in recent years, although this data is not thought to be totally reliable. Canadian domestic landings reached a peak in 1985 (3531 t) and have declined to 1269 t in 1992. The 1988 precautionary TAC of 3,200 t has never limited the fishery (Fig.3). Although in the past 4X accounted for the largest proportion of the landings under the old management unit, in recent years (1989-1992) landings in 4X and 4W have been similar. Together they account for approximately 50% of the Canadian landings in 4VWX3NOP. The Canadian fishery is prosecuted mainly in the spring and summer in 4VWX (Table 3a) and primarily in the spring in 3NOPs (Table 3b). Foreign landings (Table 3b, 3c) are incidental on the Scotian Shelf taken as bycatch in the silver hake fishery while the EEC prosecute a spring and summer fishery in 3NO.

Small vessels (TC1-3) using longline gear are the dominant fleet in the Scotian Shelf fishery accounting for over 70% of the landings (Table 4 and Fig. 4a). Landings by the IQ and generalist fleets in 4X, although low, have increased in recent years while the longline catch has been declining. For the offshore mobile fleet, halibut is a bycatch in the 4VW fishery. Longliners account for most of the Canadian landings in 3NOPs (Table 5, Fig 4b).

The shortfall in the 1992 Canadian allocations (from quota reports) amounted to 1914 t. Fixed gear caught less than 50% of their allocation, while the mobile gear, bycatch fishery, generally took less than 20% of their allocation. The <65' mobile gear fleet was the only gear sector to exceed their allocation. Quota allocations and associated catch for 1992 are presented in Table 6.

With the introduction of a precautionary TAC in 1988 the halibut fishery has been regulated by allocations to five gear sectors: 1) fixed gear <65'; 2) mobile gear <65'; 3) fixed gear 65-100'; 4) mobile gear 65-100'; and 5) all gear >100'. Longliners are the only gear type vessels which direct for halibut, with the mobile fleets restricted to bycatch only. Allocations to these various fleet sectors were generally based on a five year catch history. Since 1984 special permits were given to inshore fixed gear vessels from Scotia-Fundy to allow them access to the halibut fishery in 3NO. In order to do this, a special allocation of cod provides sufficient bycatch to pursue the halibut fishery. During 1984-1992 this cod allocation was shared between Scotia Fundy and Newfoundland based vessels. However due to weather conditions, Scotia-Fundy vessels often get a late start in this fishery and most of the cod allocation is taken by Newfoundland vessels earlier in the season. As a result, Scotia-Fundy vessels may not have enough cod bycatch to

pursue a directed halibut fishery. To deal with this problem, for the 1993 fishery, each Region's fleet has its own cod allocation.

New management initiatives for 1993 included the introduction of mandatory landings for the 1993 fishery, thus eliminating the minimum size regulation for halibut. Fixed gear interests requested the exemption of small halibut from the mandatory landing regulation. However while licence condition can be used to allow a relaxation of the rule (i.e. dogfish, skate) the "may" clause makes it impossible to force fishermen to throw back small halibut. Landings of small halibut have risen considerably by all gear sectors since the introduction of this regulation. The < 65 ft. mobile gear fleet has already exceeded their 1993 allocation (June 15).

With the downturn in the cod fishery in 4VW more fixed gear fishermen in this area may participate in the directed halibut fishery in 1993.

Abundance Indices

Commercial Catch Rates

A commercial catch rate series based on halibut directed longline catch and effort was estimated from zonal catch effort data (ZIF) for 1985 to 1992 for 4VWX, 4VWX&3NOPs and 3NOPs alone (Table 7, Fig. 5). For the years prior to 1985, catch rates for 4VWX were calculated using only regional data (Neilson *et al.* 1987). Data from all tonnage classes of longliners for the whole year was used in developing the series. Inconsistencies between NAFO data and ZIF or regional data precluded redoing the entire CPUE series for the whole stock area. It should also be noted that prior to 1988 longline effort was collected as number of lines fished and converted to number of hooks and since has been reported as hooks.

For 4VWX the trend remained more or less stable until 1978. The CPUE index then increased appreciably, coincident with a period of increased landings. In 1981 the CPUE began to fall despite still increasing landings and, with some variability, notably 1988, has continued to do so until the present. The CPUE indices for 3NOPs and the combined area, 1985-1992, show a dramatic increase to 1988, possibly related to the introduction of the more efficient circle hook in the mid 1980s, and a subsequent decline since. Anecdotal information from industry indicated no real change in the halibut fishery that would account for the decline. Some suggested that effort had been redirected into the swordfish fishery and as well that effort fluctuates with the available cod quota. Industry comments also reflected the concern that the introduction of the circle hook allowed the removal of much larger fish from the population than previously with the J hook.

Another factor that may have influenced CPUE was the introduction of the minimum size regulation in 1988. However it was indicated by some industry representatives that fishermen were not throwing back small halibut and limited commercial sampling agrees with this

perception (Fig 6). Over the time period examined longliners continued to catch fish generally above the minimum size while trawlers generally caught fish well below the legal size.

Research Surveys

The distribution of Atlantic halibut was examined by plotting catches in the Scotia-Fundy spring (1979-1984), summer (1970-1992) and fall (1978-1984) groundfish RV surveys (Fig. 7). In spring halibut appear to concentrate along the shelf edge and in the deeper water in the vicinity of the Gully and along the edge of Western Bank. In 4X halibut were most abundant on Baccaro and Browns Banks and extend up into the Bay of Fundy. Fall distributions were similar although there were fewer fish in the Bay of Fundy. In general, summer catches were lower but with a similar distribution pattern. Mean numbers per tow by stratum for the summer RV survey (Table 8 and Fig. 8) indicate that the highest catches of halibut occur in strata 450, 463 and 480.

The summer 1985-1989 distribution appeared to indicate increased concentrations in the Western Bank closed area. To investigate this further, abundance in the strata (463-465) associated with the 4W haddock closed area (1986-1992) were examined. The results give no clear indication of a significant increase in abundance associated with implementation of the closed area.

The trend in mean numbers per tow 1970-1992 obtained from summer RV surveys on the Scotian Shelf (Table 9 and Fig. 9a) suggest an increase in abundance between 1970 and 1980 and a subsequent decline to 1983. Since that time survey abundance has been increasing slowly. Spring and fall surveys (Fig. 9b) 4VWX show a declining trend to 1984 while the 4VW spring survey is variable. Survey results were not available for the southern Grand Banks.

The research gear does not appear to sample the older larger halibut which predominate the catch of the commercial fishery (Fig. 6, 10). Halibut above 90 cm tend to dominate the longline fishery while the survey length distribution is generally between 30 and 90 cm. As well, the surveys typically catch very few halibut per tow, making extrapolation of the data more difficult. Length frequency information for halibut from the spring summer and fall surveys on the Scotian Shelf is summarized in Fig. 11, for recent years. Similar data were unavailable for the southern Grand Banks portion of the stock. However, International Observer Program (IOP) data, 1980-1989, indicated a comparative absence of small halibut in Newfoundland waters, suggesting that the larger fish generally found in Newfoundland waters may have originated from the Scotian Shelf nursery area (Neilson et al. 1993).

Conclusions

In the past (1985) an attempt was made to gain some expertise in the age determination of halibut in order to be able to supply age structured data for assessments. This initiative has not been pursued. As well, commercial sampling continues to be inadequate due in some part to the sporadic nature of the landings and possibly, the lack of an established research program. The

expansion of the stock area to include 3NOPs without a coordinated program between the two regions also causes some difficulty in compiling the necessary data to assess the stock status.

Survey results (4VWX only) and commercial catch rates provide our best data sources and they give conflicting results with the survey indicating a gradual increase in abundance and the commercial catch rates declining. Because they possibly catch quite a different size distribution of halibut, it may be useful to investigate using the survey catch rates as an indicator of recruitment potential to the fishery.

Overall catch rates are declining despite the introduction of the more efficient circle hook, and declining landings by most fleet sectors. In the recent past only the < 65 ft. mobile gear fleet has been in any way limited by their allocation. The introduction of the minimum size regulation appears to have had little if any effect on the population although it may be impossible to draw any conclusions. Generally the minimum size regulation was not strictly enforced. However the introduction of mandatory landings for 1993 may make this a moot point.

Prognosis

Canadian catches in 1992 are the lowest since 1978 for the Scotian Shelf and the lowest since 1985 for the Southern Grand Banks. Commercial catch rates have been declining in all areas over time , despite an improvement in technology and show no signs of increasing. Increased effort may be directed toward the halibut fishery in the future in view of declining cod stocks.

The precautionary TAC set in 1988 was largely a reflection of catch levels at the time. Overall the decrease in landings, coupled with the declining commercial catch rates would suggest that the Atlantic halibut stock size is decreasing and that the current TAC is too high.
As well industry comments concerning the lack of large halibut and declining catch rates supports this view of the resource.

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Table 1. Halibut landings (t round fresh) by country for divs. 4VWX and divs. 3N0 and 3Ps.

	4VWX			3N0Ps			Total 4VWX + 3NOPs
Year	Canada	Foreign	Total	Canada	Foreign	Total	
1961	1498	78	1576	1230	468	1698	3274
1962	1660	40	1700	1194	339	1533	3233
1963	1453	80	1533	674	222	896	2429
1964	1461	90	1551	373	583	956	2507
1965	1574	35	1609	167	414	581	2190
1966	1030	146	1176	318	212	530	1706
1967	1236	12	1248	368	568	936	2184
1968	1175	42	1217	415	285	700	1917
1969	1024	57	1081	413	256	669	1750
1970	818	12	830	664	25	689	1519
1971	946	59	1005	481	100	581	1586
1972	825	25	850	402	89	491	1341
1973	765	9	774	452	42	494	1268
1974	641	13	654	345	136	481	1135
1975	638	12	650	332	87	419	1069
1976	708	6	714	269	76	345	1059
1977	705	8	713	576	27	603	1316
1978	1082	10	1092	337	8	345	1437
1979	1224	-	1224	420	3	423	1647
1980	1454	4	1458	255	40	295	1753
1981	1389	6	1395	217	27	244	1639
1982	1720	5	1725	468	54	522	2247
1983	1827	5	1832	253	193	446	2278
1984	1954	40	1994	871	182	1053	3047
1985	1940	28	1968	1591	472	2063	4031
1986	1609	23	1632	1492	221	1713	3345
1987	1161	22	1183	801	589	1390	2573
1988	1263	3	1266	765	277	1042	2308
1989	1156	2	1158	669	115	784	1942
1990*	1083	7	1090	694	305	999	2089
1991*	990	59	1049	429	690	1119	2168
1992*	931	-	931	338	62	400	1331

* Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 2. Halibut landings by division and year for all countries combined.

Year	4V	4W	4X	Total 4VWX	3N	3O	3Ps	Total 3NOPs	Total
1961	415	544	617	1576	212	840	646	1698	3274
1962	294	621	785	1700	67	1180	286	1533	3233
1963	214	479	840	1533	125	561	210	896	2429
1964	332	358	861	1551	88	335	533	956	2507
1965	486	458	665	1609	66	341	174	581	2190
1966	527	318	331	1176	112	225	193	530	1706
1967	380	322	546	1248	234	372	330	936	2184
1968	250	363	604	1217	118	284	298	700	1917
1969	192	433	456	1081	91	298	280	669	1750
1970	115	349	366	830	133	246	310	689	1519
1971	231	360	414	1005	164	241	176	581	1586
1972	178	216	456	850	104	254	133	491	1341
1973	147	226	401	774	79	228	187	494	1268
1974	123	127	404	654	20	267	194	481	1135
1975	115	159	376	650	93	169	157	419	1069
1976	144	148	422	714	76	182	87	345	1059
1977	88	177	448	713	36	178	389	603	1316
1978	244	283	565	1092	43	137	165	345	1437
1979	230	358	636	1224	49	213	161	423	1647
1980	339	371	748	1458	46	104	145	295	1753
1981	250	379	766	1395	42	64	138	244	1639
1982	342	476	907	1725	63	288	171	522	2247
1983	419	546	867	1832	173	117	156	446	2278
1984	496	572	926	1994	279	463	311	1053	3047
1985	606	620	742	1968	516	1032	515	2063	4031
1986	553	579	500	1632	394	907	412	1713	3345
1987	345	354	484	1183	750	457	183	1390	2573
1988	298	360	608	1266	656	245	141	1042	2308
1989	300	415	443	1158	334	227	223	784	1942
1990*	275	367	448	1090	497	322	182	1001	2093
1991*	221	456	372	1049	770	237	112	1119	2168
1992*	199	380	352	931	164	175	61	400	1331

* Data from DFO Statistics; provisional data for countries other than Canada.

Table 3a. Halibut landings for Canada (Maritimes and Quebec) for divisions 4VWX by quarter of year for 1970 - 1992.

	4V					4W					4X					
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	Total
1970	59	19	23	7	108	122	119	88	18	347	44	134	121	64	363	818
1971	110	44	56	8	218	124	114	61	15	314	49	111	180	74	414	946
1972	58	31	83	6	178	26	77	78	12	193	38	135	220	61	454	825
1973	53	23	57	10	143	56	102	57	10	225	49	128	160	60	397	765
1974	43	27	40	8	118	7	47	67	6	127	21	96	184	95	396	641
1975	45	19	39	5	108	23	66	57	11	157	23	124	162	64	373	638
1976	50	45	44	3	142	8	88	47	4	147	35	113	179	92	419	708
1977	21	15	33	15	84	11	78	64	23	176	69	166	147	63	445	705
1978	35	88	55	66	244	24	139	99	14	276	54	206	224	78	562	1082
1979	47	90	62	31	230	20	253	78	7	358	65	260	206	105	636	1224
1980	83	140	74	40	337	40	209	91	31	371	85	317	196	148	746	1454
1981	75	86	72	13	246	78	197	73	31	379	127	273	242	122	764	1389
1982	44	154	113	31	342	69	199	176	31	475	117	283	335	168	903	1720
1983	48	227	104	39	418	86	277	164	18	545	129	289	340	106	864	1827
1984	103	197	140	18	458	61	199	295	17	572	119	176	442	187	924	1954
1985	143	313	123	14	593	52	252	279	23	606	90	179	374	98	741	1940
1986	107	322	96	12	537	47	252	259	14	572	62	128	248	62	500	1609
1987	71	153	88	16	328	37	176	127	9	349	49	172	211	52	484	1161
1988	84	114	71	26	295	11	155	188	6	360	80	201	263	64	608	1263
1989	99	121	52	26	298	75	133	191	16	415	83	137	174	49	443	1156
1990*	111	104	42	15	272	46	110	189	18	363	77	121	187	63	448	1083
1991*	65	98	46	5	214	29	118	233	27	407	70	159	93	47	369	990
1992*	62	69	41	27	199	36	138	176	30	380	54	130	112	56	352	931

* Data from DFO Statistics Branch.

Table 3b. Halibut landings for Canada (Maritimes and Quebec) for divisions 3NOPs by quarter of year for 1970 - 1992.

	3N					30					3Ps					
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	Total
1970	82	32	14	5	133	141	34	21	50	246	162	16	44	63	285	664
1971	34	69	18	7	128	58	25	51	58	192	86	52	15	8	161	481
1972	4	20	12	7	43	56	36	32	104	228	61	20	27	23	131	402
1973	1	4	40	11	56	86	73	34	32	225	87	26	36	22	171	452
1974	5	3	4	3	15	71	63	18	2	154	59	74	27	16	176	345
1975	0	34	21	16	71	36	34	18	17	105	32	88	30	6	156	332
1976	8	47	2	1	58	54	51	18	5	128	16	22	32	13	83	269
1977	4	13	0	4	21	43	36	39	55	173	59	168	30	125	382	576
1978	10	16	6	8	40	25	74	22	12	133	20	67	55	22	164	337
1979	1	23	13	12	49	20	102	41	50	213	55	69	17	17	158	420
1980	10	7	9	20	46	4	25	46	21	96	22	37	30	24	113	255
1981	0	9	13	11	33	27	16	12	9	64	50	47	20	3	120	217
1982	0	2	7	26	35	71	193	8	7	279	21	81	33	19	154	468
1983	3	17	3	2	25	55	33	17	4	109	38	39	31	11	119	253
1984	3	80	131	1	215	63	174	96	85	418	44	78	40	76	238	871
1985	25	94	93	74	286	182	394	167	134	877	120	155	94	59	428	1591
1986	0	57	199	7	263	376	255	180	32	843	149	167	59	11	386	1492
1987	21	142	160	7	330	115	177	41	5	338	46	53	27	7	133	807
1988	72	182	153	30	437	84	100	22	30	236	45	19	19	9	92	765
1989	59	136	77	11	283	69	101	35	7	212	64	75	26	9	174	669
1990*	20	112	57	9	198	98	145	57	15	315	71	79	25	6	181	694
1991*	2	46	17	19	84	58	132	25	18	233	55	29	24	4	112	429
1992*	15	35	40	12	102	53	68	37	17	175	11	35	7	8	61	338

* Data from DFO Statistics Branch.

Table 3c. Halibut landings for all Foreign Countries combined for divisions 4VWX by quarter of year for 1970 - 1992.

	4V						4W						4X						
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK	Total	Total
1970	3	2	2	0		7	-	2	-	-		2	0	2	0	1		3	12
1971	0	0	6	7		13	2	44	0	0		46	-	-	-	-		-	59
1972	-	-	-	-		-	1	1	0	1	20	23	2	0	0	0		2	25
1973	3	1	0	0		4	0	1	0	0		1	2	1	0	1		4	9
1974	0	0	2	3		5	-	-	-	-		-	6	2	0	0		8	13
1975	3	1	3	-		7	0	1	0	0	1	2	1	0	0	0	2	3	12
1976	2	-	-	-		2	0	0	0	0	1	1	1	0	0	0	2	3	6
1977	4	-	-	-		4	-	1	-	-		1	1	0	0	0	2	3	8
1978	-	-	-	-		-	-	-	4	3		7	1	0	0	0	2	3	10
1979	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-
1980	2	-	-	-		2	-	-	-	-		-	0	0	0	1	1	2	4
1981	3	1	0	0		4	-	-	-	-		-	0	0	1	0	1	2	6
1982	-	-	-	-		-	-	-	1	-		1	0	0	1	0	3	4	5
1983	1	-	-	-		1	-	-	1	-		1	0	0	0	0	3	3	5
1984	32	-	2	4		38	-	-	-	-		-	0	0	0	0	2	2	40
1985	1	6	1	5		13	-	14	-	-		14	0	0	0	0	1	1	28
1986	4	4	5	3		16	0	7	0	0		7	-	-	-	-	-	-	23
1987	1	4	12	0		17	0	5	0	0		5	-	-	-	-	-	-	22
1988	0	1	1	1		3	-	-	-	-		-	-	-	-	-	-	-	3
1989	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	2
1990*	-	-	-	-	3	3	-	-	-	-	4	4	-	-	-	-	-	-	7
1991*	-	-	-	-	7	7	-	-	-	-	49	49	-	-	-	-	3	3	59
1992*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3d. Halibut landings for all Foreign Countries combined for divisions 3NOPs by quarter of year for 1970 - 1992.

	3N						30						3Ps						
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK	Total	Total
1970	-	-	-	-		-	-	-	-	-		-	17	6	2	0		25	25
1971	-	15	21	0		36	0	48	1	0		49	14	1	0	0		15	100
1972	18	7	2	34		61	0	14	0	12		26	2	0	0	0		2	89
1973	1	3	19	0		23	0	0	3	0		3	2	7	6	1		16	42
1974	0	0	5	0		5	51	17	45	0		113	11	5	0	2		18	136
1975	15	0	7	0		22	5	47	12	0		64	1	-	-	-		1	87
1976	18	-	-	-		18	54	-	-	-		54	-	1	3	-		4	76
1977	-	5	10	-		15	5	-	-	-		5	5	2	-	-		7	27
1978	-	2	-	1		3	-	4	-	-		4	1	-	-	-		1	8
1979	-	-	-	-		-	-	-	-	-		-	2	1	-	-		3	3
1980	-	-	-	-		-	-	2	-	6		8	6	7	8	11		32	40
1981	0	1	6	2		9	-	-	-	-		-	5	4	0	9		18	27
1982	2	19	5	2		28	-	7	2	-		9	6	11	-	-		17	54
1983	17	100	4	27		148	6	2	-	-		8	1	24	9	3		37	193
1984	-	19	11	34		64	-	1	6	38		45	53	15	4	1		73	182
1985	41	85	74	29	1	230	66	25	25	39		155	33	48	6	-		87	472
1986	52	43	26	7	3	131	11	28	15	10		64	9	8	6	3		26	221
1987	66	187	72	94	1	420	37	47	27	8		119	19	22	1	8		50	589
1988	91	83	16	16	13	219	0	5	0	4		9	37	8	1	3		49	277
1989	-	-	-	-	51	51	-	-	-	-	15	15	-	-	-	-	49	49	115
1990*	-	-	-	-	299	299	-	-	-	-	6	6	-	-	-	-		-	305
1991*	-	-	-	-	686	686	-	-	-	-	4	4	-	-	-	-		-	690
1992*	-	-	-	-	61	61	-	-	-	-	-	-	-	-	-	-		-	61

* Provisional

Table 4a. Halibut landings for OTB TC 1-3 by quarter of year for 1970 - 1992 for Canada (Maritimes and Quebec).

	4V					4W					4X					
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	Total
1970	-	-	-	-	-	-	1	-	-	1	5	7	1	1	14	15
1971	-	-	-	-	-	-	1	-	-	1	1	8	19	1	29	30
1972	-	-	-	-	-	-	-	-	-	-	0	2	0	0	2	2
1973	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1974	-	-	-	-	-	-	-	-	-	-	0	3	1	0	4	4
1975	-	-	-	-	-	-	1	-	-	1	-	11	6	2	19	20
1976	-	-	-	-	-	-	-	-	-	-	0	2	1	1	4	4
1977	-	-	-	-	-	0	0	0	1	1	1	7	6	2	16	17
1978	-	-	-	-	-	-	-	-	-	-	1	7	6	2	16	16
1979	-	-	-	-	-	0	0	2	-	2	3	35	13	5	56	58
1980	0	1	0	0	1	0	5	0	0	5	4	43	12	8	67	73
1981	-	-	-	-	-	1	3	0	0	4	14	18	19	4	55	59
1982	-	-	-	-	-	3	5	0	0	8	7	28	16	6	57	65
1983	-	-	-	-	-	1	2	0	0	3	15	36	20	4	75	78
1984	-	-	-	-	-	0	2	0	-	2	16	20	19	1	56	58
1985	-	-	-	-	-	0	2	0	0	2	9	15	8	2	34	36
1986	1	0	0	0	1	-	-	-	-	-	10	8	4	1	23	24
1987	-	-	-	-	-	0	2	0	0	2	11	11	4	0	26	28
1988	-	-	-	-	-	0	6	0	0	6	21	34	3	2	60	66
1989	-	-	-	-	-	0	5	0	0	5	28	17	2	1	48	53
1990*	0	1	0	0	1	1	1	0	0	2	29	24	20	20	93	96
1991*	0	0	0	0	0	0	1	1	0	2	31	29	10	18	88	90
1992*	0	0	0	0	0	0	0	0	0	0	27	27	14	15	83	83

* Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 4b. Halibut landings for OTB TC 4+ by quarter of year for 1970 - 1992.

	4V					4W					4X					
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	Total
1970	16	7	2	6	31	49	27	16	7	99	18	28	7	19	72	202
1971	31	15	4	0	50	87	40	8	4	139	35	31	5	8	79	268
1972	22	10	2	0	34	16	7	11	9	43	20	15	8	2	45	122
1973	8	2	0	1	11	22	10	3	3	38	36	10	1	3	50	99
1974	12	11	1	3	27	2	0	1	2	5	3	2	5	10	20	52
1975	10	16	6	1	33	3	10	-	3	16	4	9	20	17	50	99
1976	14	12	20	2	48	0	2	1	3	6	16	13	36	26	91	145
1977	7	9	13	14	43	3	5	11	13	32	35	21	2	13	71	146
1978	20	62	23	10	115	12	32	15	8	67	20	22	4	9	55	237
1979	21	26	20	30	97	4	21	16	3	44	24	22	3	41	90	231
1980	30	45	31	35	141	33	35	16	28	112	22	6	3	33	64	317
1981	23	38	19	13	93	45	42	8	8	103	25	11	0	13	49	245
1982	27	65	47	26	165	15	31	8	7	61	18	5	5	10	38	264
1983	16	30	29	30	105	19	29	13	1	62	16	3	3	1	23	190
1984	33	19	8	5	65	6	7	1	0	14	6	2	1	0	9	88
1985	61	55	15	8	139	0	1	1	0	2	3	0	0	0	3	144
1986	19	48	8	4	79	1	0	0	1	2	1	1	0	0	2	83
1987	19	15	8	1	43	-	-	-	-	-	1	0	0	0	1	44
1988	8	6	0	0	14	2	0	1	0	3	-	-	-	-	-	17
1989	4	3	4	1	12	-	-	-	-	-	-	-	-	-	-	12
1990*	12	13	2	3	30	1	0	0	-	1	1	0	0	0	1	32
1991*	16	15	5	1	37	0	1	40	6	47	0	1	2	1	4	88
1992*	7	5	0	3	15	2	27	0	0	29	1	1	0	0	2	46

* Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 4c. Halibut landings for LL, LHP TC 1-3 by quarter of year for 1970 - 1992.

	4V						4W						4X						
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	UK	Total	Total
1970	36	8	21	1	-	66	64	88	70	11		233	18	88	108	43		257	556
1971	62	19	36	-		117	29	67	51	11		158	12	63	149	65		289	564
1972	21	7	65	0		93	0	53	58	3		114	18	97	198	59		372	579
1973	37	11	49	2		99	32	80	49	7		168	13	116	157	57		343	610
1974	25	7	21	0		53	2	43	57	2		104	18	83	172	83		356	513
1975	28	2	24	-		54	12	47	57	8		124	19	100	134	45		298	476
1976	28	16	24	1		69	7	77	44	1		129	19	91	140	63		313	511
1977	14	6	16	1		37	8	67	47	7		129	32	122	119	44		317	483
1978	14	10	11	0		35	10	91	71	2		174	32	155	196	58		441	650
1979	25	27	32	1		85	16	213	57	4		290	35	167	183	51		436	811
1980	34	39	28	2		103	6	159	55	3		223	57	241	172	106		576	902
1981	17	39	44	0		100	32	149	62	21		264	87	231	210	102		630	994
1982	3	72	53	4		132	49	159	166	24		398	90	242	308	150		790	1320
1983	10	180	75	6		271	62	243	148	13		466	97	242	301	97		737	1474
1984	41	171	132	12		356	48	165	292	17		522	96	153	416	176		841	1719
1985	47	254	103	5		409	51	249	277	22		599	71	155	360	91		677	1685
1986	40	271	88	6		405	42	245	251	13		551	45	111	232	54		442	1398
1987	21	134	78	4		237	37	173	126	8		344	37	146	206	52		441	1022
1988	39	107	71	26		243	8	149	185	4		346	59	167	254	62		542	1131
1989	30	114	43	9		196	75	121	189	16		401	55	120	171	48		394	991
1990*	32	85	40	4		161	44	107	187	17		355	42	96	161	42		341	857
1991*	26	78	40	1		145	29	115	189	21		354	38	124	79	27		268	767
1992*	36	62	40	23		161	32	107	172	30		341	25	100	96	41		262	764

* Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 4d. Halibut landings for LL, LHP TC 4+ by quarter of year for 1970 - 1992.

	4V					4W					4X					
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	Canadian Total
1970	7	4	-	-	11	9	3	-	-	12	3	1	-	-	4	27
1971	17	10	16	8	51	8	4	1	-	13	1	-	-	-	1	65
1972	15	14	16	6	51	10	9	3	0	22	0	7	0	0	7	80
1973	8	10	8	7	33	1	9	2	0	12	-	-	-	-	-	45
1974	6	8	15	3	32	3	0	1	0	4	0	1	0	0	1	37
1975	7	1	9	4	21	7	6	-	-	13	-	-	-	-	-	34
1976	7	17	0	0	24	1	8	0	-	9	-	-	-	-	-	33
1977	0	0	4	0	4	0	2	-	-	2	0	2	-	-	2	8
1978	1	11	20	2	34	1	2	1	1	5	-	-	-	-	-	39
1979	1	37	10	0	48	0	6	0	0	6	1	1	0	4	6	60
1980	19	55	15	3	92	1	3	18	0	22	2	3	0	0	5	119
1981	35	9	9	0	53	0	1	1	0	2	-	-	-	-	-	55
1982	14	17	13	1	45	2	4	0	0	6	-	-	-	-	-	51
1983	22	17	0	3	42	4	1	0	3	8	-	-	-	-	-	50
1984	29	7	0	1	37	7	21	0	-	28	1	0	0	9	10	75
1985	35	4	5	1	45	1	0	0	0	1	5	0	0	3	8	54
1986	47	2	0	2	51	1	0	0	0	1	-	-	-	-	-	52
1987	31	4	2	11	48	-	-	-	-	-	-	-	-	-	-	48
1988	37	1	0	0	38	-	-	-	-	-	-	-	-	-	-	38
1989	65	4	5	16	90	-	-	-	-	-	-	-	-	-	-	90
1990*	67	3	0	8	78	-	0	-	1	1	-	-	-	-	-	79
1991*	23	5	1	2	31	-	0	-	0	0	-	-	-	-	-	31
1992*	19	2	1	1	23	2	1	1	-	4	0	0	-	-	0	27

* Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 4e. Halibut landings for other gear, all tonnage classes combined by quarter of year for 1970 - 1992.

	4V					4W					4X					
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	Canadian Total
1970	-	-	-	-	-	-	-	2	-	2	-	10	5	1	16	18
1971	-	-	-	-	-	-	2	1	-	3	-	9	7	-	16	19
1972	-	-	-	-	-	0	8	6	0	14	0	14	0	0	28	42
1973	-	-	-	-	-	1	3	3	0	7	0	2	2	0	4	11
1974	0	1	3	2	6	0	4	8	2	14	0	7	6	2	15	35
1975	-	-	-	-	-	1	2	-	-	3	-	4	2	-	6	9
1976	1	0	0	0	1	0	1	2	0	3	0	7	2	2	11	15
1977	-	-	-	-	-	0	4	6	2	12	1	14	20	4	39	51
1978	0	5	1	54	60	1	14	12	3	30	1	22	18	9	50	140
1979	-	-	-	-	-	0	13	3	0	16	2	35	7	4	48	64
1980	-	-	-	-	-	0	7	2	0	9	0	24	9	1	34	43
1981	-	-	-	-	-	0	2	2	2	6	1	13	13	3	30	36
1982	-	-	-	-	-	0	0	2	0	2	2	8	6	2	18	20
1983	-	-	-	-	-	0	2	3	1	6	1	8	16	4	29	30
1984	-	-	-	-	-	0	4	2	0	6	0	1	6	1	8	14
1985	-	-	-	-	-	0	0	1	1	2	2	9	6	2	19	21
1986	0	1	0	0	1	3	7	8	0	18	6	8	12	7	33	51
1987	-	-	-	-	-	0	1	1	1	3	0	15	1	0	16	19
1988	-	-	-	-	-	1	0	2	2	5	0	0	6	0	6	11
1989	-	-	-	-	-	0	7	2	0	9	0	0	1	0	1	10
1990*	0	2	0	0	2	0	2	2	0	4	5	1	6	1	13	19
1991*	0	1	0	0	1	0	1	3	0	4	1	5	2	1	9	14
1992*	0	0	0	0	0	0	0	3	0	3	-	2	3	0	4	7

* Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 5a. Halibut landings for LL, LHP TC 4+ by quarter of year for 1970 - 1992 for Canada (Maritimes and Quebec).

	3N					3O					3Ps					
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	Total
1970	7	6	-	-	13	7	-	-	-	7	6	-	-	-	6	26
1971	-	-	-	-	-	14	4	2	1	21	6	21	-	-	27	48
1972	3	18	0	0	21	3	2	3	1	9	6	0	7	1	14	44
1973	0	3	30	0	33	11	40	4	8	63	18	1	2	8	29	125
1974	-	-	-	0	-	14	33	8	1	56	14	5	9	6	34	90
1975	-	27	-	-	28	28	4	2	14	48	5	2	5	2	14	90
1976	0	23	0	0	23	29	1	0	5	35	3	1	1	0	5	63
1977	0	10	0	1	11	17	6	5	13	41	1	1	3	0	5	57
1978	9	9	0	0	18	15	2	0	2	19	0	1	8	0	9	46
1979	-	14	-	-	14	15	0	0	0	15	6	0	0	0	6	35
1980	10	3	5	0	18	0	0	0	11	11	0	0	4	0	4	33
1981	0	8	0	0	8	16	2	1	4	23	2	6	4	1	13	44
1982	0	1	0	0	1	14	9	0	0	23	0	12	9	0	21	45
1983	0	14	0	2	16	10	13	2	1	26	3	6	9	0	18	60
1984	0	0	74	0	74	9	98	36	0	143	26	8	0	14	48	265
1985	2	57	27	39	125	8	59	19	19	105	36	19	7	3	65	295
1986	0	19	24	0	43	36	119	18	23	196	27	11	0	4	42	281
1987	21	50	59	3	133	57	47	15	2	121	15	18	12	4	49	303
1988	72	102	46	27	247	53	42	9	29	133	15	7	2	6	30	410
1989	51	47	21	5	124	46	23	14	5	88	40	8	20	4	72	284
1990*	19	39	31	7	96	52	58	25	12	147	36	44	14	6	100	343
1991*	2	37	16	19	74	33	27	19	10	89	19	10	3	3	35	198
1992*	15	28	25	12	80	28	30	7	10	75	10	9	2	6	27	182

* Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 5b. Halibut landings for LL, LHP TC 1-3 by quarter of year for 1970 - 1992.

	3N					30					3Ps					
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	Total
1970	70	23	-	-	93	79	34	-	-	113	5	7	5	-	17	223
1971	34	69	7	-	110	39	21	38	7	105	16	26	14	-	56	271
1972	1	0	0	0	1	42	20	6	1	69	37	13	7	1	58	128
1973	-	-	-	-	-	7	14	24	11	56	5	14	3	3	25	81
1974	-	-	-	-	-	12	15	6	1	34	10	6	3	2	21	55
1975	-	3	1	-	4	7	12	12	2	33	6	6	10	1	23	60
1976	0	14	1	1	16	13	4	3	0	20	3	2	3	0	8	44
1977	-	-	-	-	-	4	3	2	0	9	4	11	8	0	23	32
1978	-	-	-	-	-	1	3	5	0	9	0	12	4	2	18	27
1979	-	-	-	-	-	0	12	0	1	13	1	3	0	0	4	17
1980	-	-	-	-	-	3	13	0	0	16	2	10	7	3	22	38
1981	-	-	-	-	-	-	-	-	-	-	1	14	1	1	17	17
1982	-	-	-	-	-	-	-	-	-	-	2	12	14	1	29	29
1983	-	-	-	-	-	0	3	15	-	18	6	28	10	0	44	62
1984	0	79	56	0	135	1	74	56	2	133	5	53	9	0	67	335
1985	19	32	64	32	147	0	143	120	47	310	1	87	35	2	125	582
1986	0	32	170	3	205	0	55	146	0	201	41	114	50	3	208	614
1987	0	87	93	3	183	8	31	24	0	63	2	26	6	1	35	281
1988	0	80	105	1	186	6	44	13	1	64	15	5	16	0	36	286
1989	8	87	55	5	155	5	60	19	0	84	14	54	4	0	72	311
1990*	1	72	26	2	101	11	50	31	1	93	5	12	10	0	27	221
1991*	-	7	-	-	7	3	28	6	7	44	1	9	19	1	30	81
1992*	-	7	14	-	21	1	22	27	-	50	11	13	3	1	28	99

* Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 5c. Halibut landings for all other gears by quarter of year for 1970 - 1992.

	3N					3O					3Ps					
Year	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	1st Quart.	2nd Quart.	3rd Quart.	4th Quart.	Total	Total
1970	5	3	14	5	27	55	-	21	50	126	151	9	39	63	262	415
1971	0	0	11	7	18	5	0	11	50	66	64	5	1	8	78	162
1972	0	2	12	7	21	11	14	23	102	150	18	7	13	21	59	230
1973	1	1	10	11	23	68	19	6	13	106	64	11	31	11	117	246
1974	5	3	4	3	15	45	15	4	0	64	35	63	15	8	121	200
1975	0	4	20	15	39	1	18	4	1	24	21	80	15	3	119	182
1976	8	10	1	0	19	12	46	15	0	73	10	19	28	13	70	162
1977	4	3	0	3	10	22	27	32	42	123	54	156	19	125	354	487
1978	1	7	6	8	22	9	69	17	10	105	20	54	43	20	137	264
1979	1	9	13	12	35	5	90	41	49	185	48	66	17	17	148	368
1980	0	4	4	20	28	1	12	46	10	69	20	27	19	21	87	184
1981	0	1	13	11	25	11	14	11	5	41	47	27	15	1	90	156
1982	0	1	7	26	34	57	184	8	7	256	19	57	10	18	104	394
1983	3	3	3	0	9	45	17	0	3	65	29	5	12	11	57	131
1984	3	1	1	1	6	53	2	4	83	142	13	17	31	62	123	271
1985	4	5	2	3	14	174	192	28	68	462	83	49	52	54	238	714
1986	0	6	5	4	15	340	81	16	9	446	81	42	9	4	136	597
1987	0	5	8	1	14	50	99	2	3	154	29	9	9	2	49	217
1988	0	0	2	2	4	25	14	0	0	39	15	7	1	3	26	69
1989	0	2	1	1	4	18	18	2	2	40	10	13	2	5	30	74
1990*	-	1	0	0	1	35	37	1	2	75	30	23	1	0	54	130
1991*	0	3	0	0	3	22	77	1	0	100	35	9	2	1	47	150
1992*	0	0	0	0	0	24	16	3	6	49	22	8	1	1	32	81

* Data from DFO Statistics Branch; provisional data for countries other than Canada.

Table 6. Management Table for halibut 1992. (Allocation and catch)

Year	Fleet	Quota (t)	Reported catch (t) Quota Reports	Percent taken (%)	Remarks
1992	**All Vessels**	3200	1286	40	quota not taken since established precautionary TAC
	3N0 FG<65'	175	67	38	
	3Ps FG<65'	80	31	39	
	4VWX FG <65'	1690	773	46	
	3Ps MG <65'	10	0	0	bycatch fishery only
	4VWX MG <65'	85	90	106	bycatch fishery only
	3N0Ps, 4VWX FG 65-100'	630	172	27	
	3N0Ps, 4VWX MG 65-100'	10	2	24	bycatch fishery only
	3NOPs, 4VWX All Vessels >100'	520	151	29	bycatch fishery only - 5% up to 4500 kg per trip

Stock	Gear	Date	Licence Condition	Remarks
Halibut - 4VWX	FG <65', LL only	March 1	Licence Condition	Cod 4,500 kg Haddock 1,500 kg
Halibut - 4VWX	FG <65', LL only	December 1		Cod 4,500 kg 10% bycatch only in 4Vn Haddock 1,500 kg

Table 7. Atlantic halibut CPUE 3NOPs for LL all TC where halibut was main species.

Year	Catch	Effort (000' hooks)	CPUE
1985	480	6899	.069
1986	406	3292	.123
1987	233	1647	.141
1988	266	1810	.147
1989	186	1419	.131
1990	173	1787	.097
1991	127	1598	.080
1992	128	1288	.099

Atlantic halibut CPUE 4VWX 3NOPs for LL all TC where halibut was main species.

Year	Catch	Effort (000' hooks)	CPUE
1985	1265	17083	.074
1986	1096	14323	.076
1987	536	6385	.083
1988	530	4937	.107
1989	435	5225	.083
1990	358	4567	.078
1991	262	4343	.060
1992	330	4723	.070

Atlantic halibut CPUE (4VWX) for LL all TC where halibut was main species.

Year	Catch	Effort (000' hooks)	CPUE
1970	131	2374	.055
1971	146	2277	.064
1972	199	3099	.064
1973	212	3653	.058
1974	172	3198	.054
1975	111	2082	.053
1976	110	1848	.060
1977	82	1477	.056
1978	68	1127	.060
1979	179	1991	.088
1980	176	2004	.092
1981	115	1253	.078
1982	220	2820	.075
1983	606	8040	.077
1984	800	11985	.067
1985	785	10185	.077
1986	691	11031	.061
1987	303	4738	.063
1988	264	3127	.084
1989	249	3806	.065
1990	185	2780	.066
1991	134	2745	.049
1992	202	3435	.059

Table 8. Mean number/tow for 4VWX halibut in Canadian bottom trawl surveys (Strata 40 - 95)[1].

Stratum	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	All
440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.26	0	.01
441	0	0	0	0	0	0	0	0	.28	0	0	0	0	0	0	.21	0	0	0	0	0	0	0	.01
442	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
443	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
444	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
445	0	.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.02
446	0	0	0	0	0	0	.32	0	.25	0	0	0	0	.32	0	.26	0	0	0	0	.32	.34	5.15	.29
447	0	0	0	0	0	0	.23	0	0	0	.17	0	0	0	0	0	0	0	0	0	0	0	0	.02
448	0	0	0	.45	0	0	0	0	0	0	.22	0	0	0	.24	0	0	0	0	0	0	0	0	.03
449	0	.49	0	1.75	.39	0	0	0	0	.55	1.97	.49	0	0	.49	0	0	0	0	0	0	.51	0	.29
450	0	0	.31	0	.63	1.54	.34	3.65	.32	1.17	1.48	1.98	2.39	1.72	.32	.32	.34	0	1.03	.34	.69	.34	0	.81
451	0	.88	1.17	2.19	0	2.02	3.83	.97	0	1.94	.42	0	.34	0	0	0	0	1.64	0	3.83	2.09	-	1.49	1.0
452	0	0	.58	0	0	1.92	1.46	0	1.94	5.51	1.47	0	2.57	1.90	2.70	0	0	.69	3.80	6.18	2.38	8.00	2.06	1.87
453	0	.44	0	.92	0	.29	0	.34	.32	2.92	.45	.36	0	1.09	1.56	0	0	0	0	.51	0	1.09	.49	.45
454	0	0	1.01	.53	0	.34	1.17	0	.97	0	.31	0	0	1.03	0	0	2.06	1.03	.51	1.54	.32	0	0	.46
455	0	0	.13	.27	1.06	.15	0	0	.25	.69	0	.61	.26	0	.14	.14	0	.27	.58	.14	0	0	0	.20
456	0	0	0	.40	.58	.79	.23	.21	.16	.17	.29	.59	0	0	.17	0	.59	1.04	0	.17	0	.15	.14	.24
457	0	0	0	.51	0	0	.95	.51	0	0	.40	1.49	0	0	0	0	0	.27	0	0	.24	1.03	0	.23
458	0	0	0	.58	0	0	.61	1.10	.58	0	0	0	0	0	0	.34	0	0	0	.32	.27	0	0	.16
459	0	0	0	0	0	0	.20	0	0	.29	.51	.58	0	0	.26	0	0	0	0	.22	.21	.22	.32	.12
460	0	0	0	0	0	0	0	0	0	0	2.02	0	1.03	0	0	0	0	0	0	.34	0	0	0	.15
461	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
462	.58	0	0	0	0	0	.55	.19	0	.24	.31	.44	.82	0	0	0	0	0	0	.76	.19	1.07	.24	.23
463	1.32	.97	1.31	.49	0	3.58	1.46	2.30	2.10	1.26	.38	1.03	0	0	.51	0	1.03	5.15	3.83	0	2.47	.51	1.52	1.36
464	.80	0	.39	.52	.34	1.29	1.32	.65	.27	.51	.17	.40	.50	0	.62	1.37	1.45	.16	1.20	.61	.12	.59	.42	.60
465	.31	.58	0	0	0	.29	.96	.39	0	.84	.32	0	.45	.18	.44	.19	1.44	.68	.13	1.17	.49	.53	.60	.43
466	0	0	.32	0	0	0	0	0	0	.36	0	0	.69	0	0	0	0	0	0	0	0	0	-	.06
470	0	0	0	0	0	0	0	.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.49	.05
471	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
472	0	0	0	0	.49	0	.88	0	0	.32	3.37	2.33	0	.46	1.03	0	0	0	.26	.21	0	0	.24	.42
473	0	0	0	0	.36	.46	0	1.61	.51	.51	0	0	.51	0	0	0	0	.51	0	0	0	0	0	.17
474	.51	.49	1.31	1.26	3.28	.92	3.09	4.01	3.09	1.17	1.03	.49	.51	0	0	0	0	1.06	0	0	0	0	0	.97
475	.55	.80	.67	0	2.81	1.02	1.34	1.09	.42	2.16	.92	.46	.51	.98	-	.49	.51	0	1.03	0	1.46	0	.49	.75
476	0	0	0	0	0	0	0	.27	0	1.03	1.17	0	0	0	0	.51	0	0	0	0	0	0	.49	.15
477	.38	.55	.82	0	.42	0	1.06	0	2.52	0	.31	2.26	.92	0	.51	.49	.51	.64	0	.73	1.03	.97	.57	.64
478	.49	0	0	0	0	0	0	.22	.58	1.90	.36	.83	.75	.36	1.03	0	.36	0	0	0	0	0	.93	.34
480	1.40	5.35	.77	2.21	1.66	3.65	3.36	18.55	4.62	.24	2.32	1.54	.51	0	0	1.90	1.99	.53	.81	4.97	2.96	.42	0	2.59
481	.19	0	.23	.21	.95	0	1.22	0	.59	0	.36	.49	.26	0	1.47	0	0	.51	2.02	.50	.13	.78	.43	.45
482	0	0	0	0	0	0	0	0	0	0	0	0	.44	0	0	0	0	0	0	0	0	0	0	.02
483	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.44	0	0	0	0	0	0	0	0	.02
484	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
485	0	0	0	0	0	0	0	0	0	0	0	0	.49	0	0	0	0	0	.63	0	0	.88	.32	.10
490	.51	0	0	0	3.06	1.71	0	.27	.56	1.15	2.16	0	0	0	0	0	.36	0	.26	0	2.33	.73	1.09	.59
491	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
492	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	.32	0	0	0	0	0	0	0	.01
493	0	0	0	0	0	0	0	0	0	.49	0	0	0	0	0	0	0	0	0	0	.31	0	1.03	.08
494	0	0	.63	0	0	2.18	0	.58	0	0	0	0	.46	0	0	.49	.51	0	0	0	0	0	0	.21
495	0	0	0	2.19	0	0	0	0	0	2.19	.58	0	.49	0	0	0	0	0	.46	.55	0	1.38	0	.34

[1] Survey Vessels 1970-1981 A.T. Cameron
1982 Lady Hammond
1983-1992 Alfred Needler

Table 9. Halibut (Summer Survey) 1970 - 1992 4VWX

Year	Mean #/Tow	Mean Wgt/Tow	S/E #	S/E Wts
1970	.12	.38	.04	.15
1971	.13	.23	.06	.08
1972	.10	.28	.02	.10
1973	.15	.26	.04	.07
1974	.21	.40	.06	.14
1975	.22	.29	.05	.07
1976	.38	.86	.09	.24
1977	.41	.85	.11	.26
1978	.25	.98	.05	.21
1979	.33	1.21	.06	.30
1980	.39	1.07	.08	.21
1981	.31	1.22	.08	.35
1982	.23	1.06	.06	.29
1983	.07	.77	.02	.52
1984	.20	1.22	.05	.43
1985	.13	.36	.03	.11
1986	.20	.33	.06	.09
1987	.19	.40	.04	.16
1988	.25	.75	.08	.41
1989	.33	.84	.07	.26
1990	.21	.42	.05	.11
1991	.31	.57	.07	.14
1992	.25	1.04	.07	.39

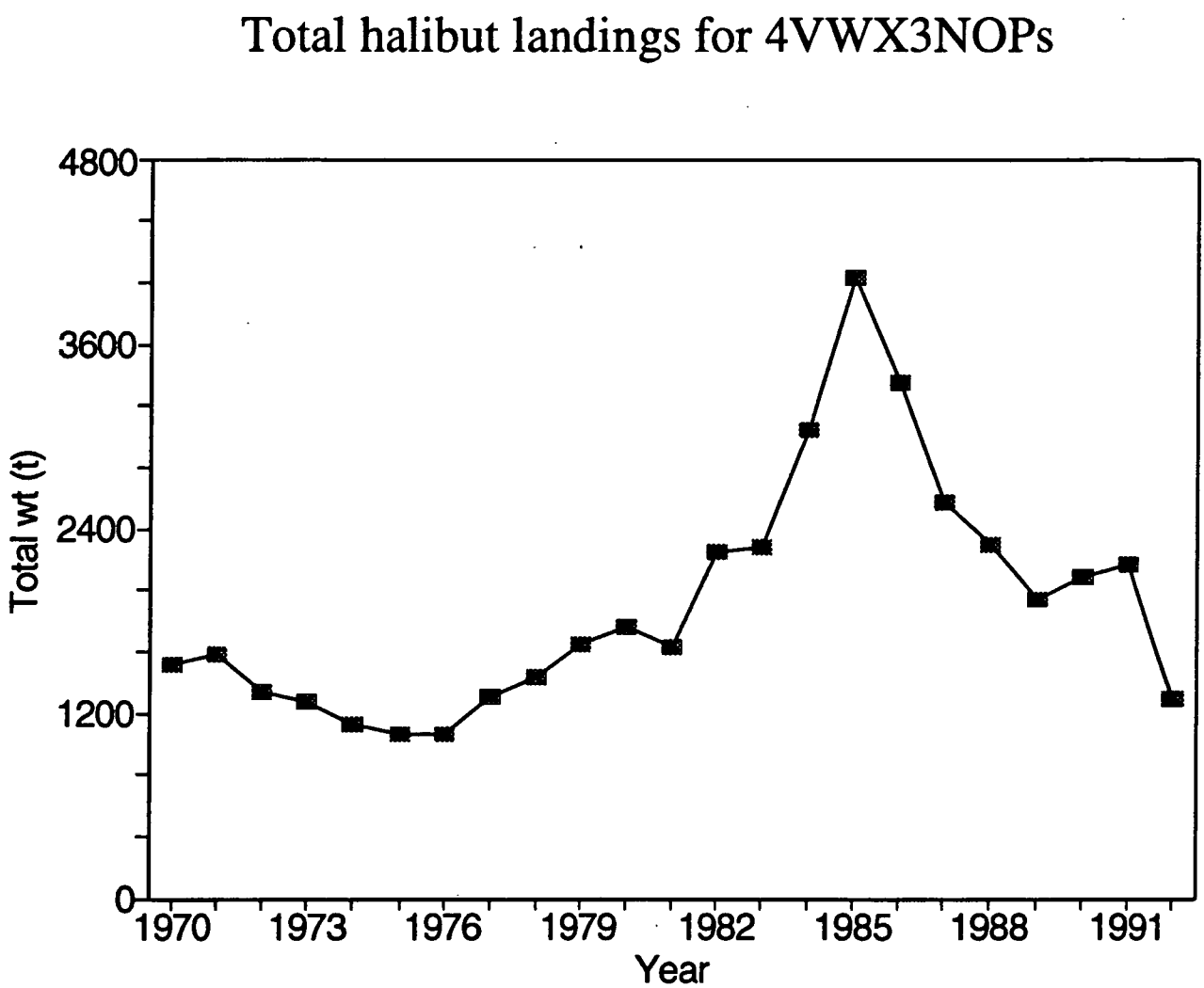


Figure 1. Total halibut landings (tonnes) for divs. 4VWX and divs. 3NOPs combined.

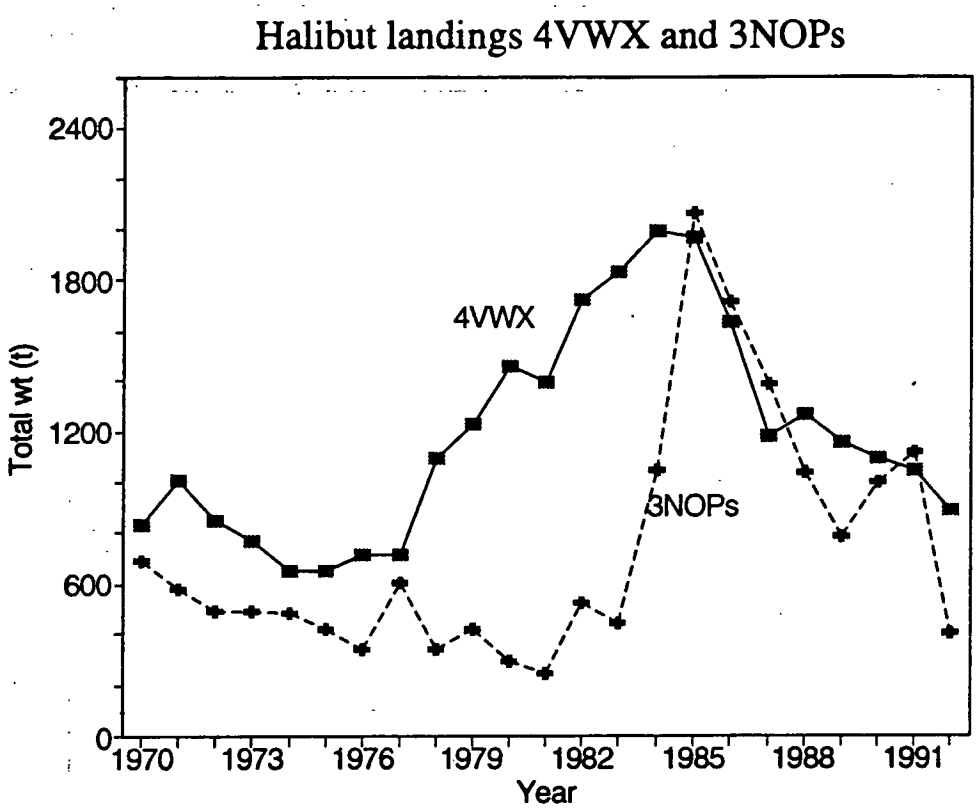


Figure 2a. Total halibut landings for divs. 4VWX and divs. 3NOPs.

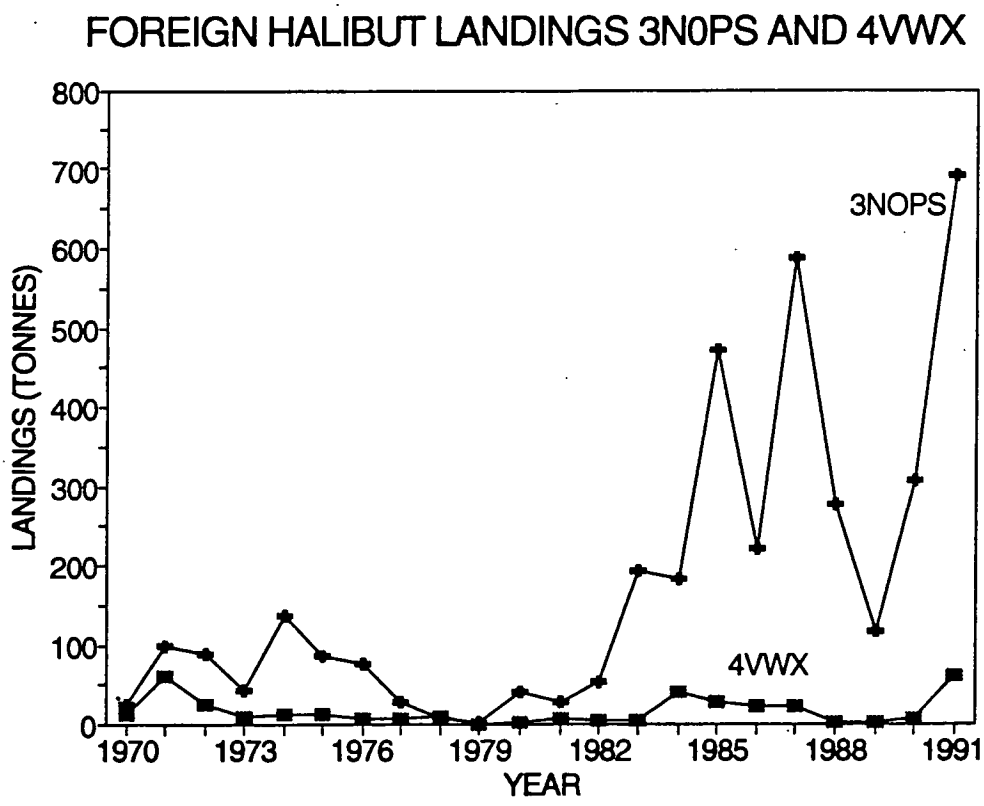


Figure 2b. Foreign (all countries combined) halibut landings for divs. 4VWX and divs. 3NOPs.

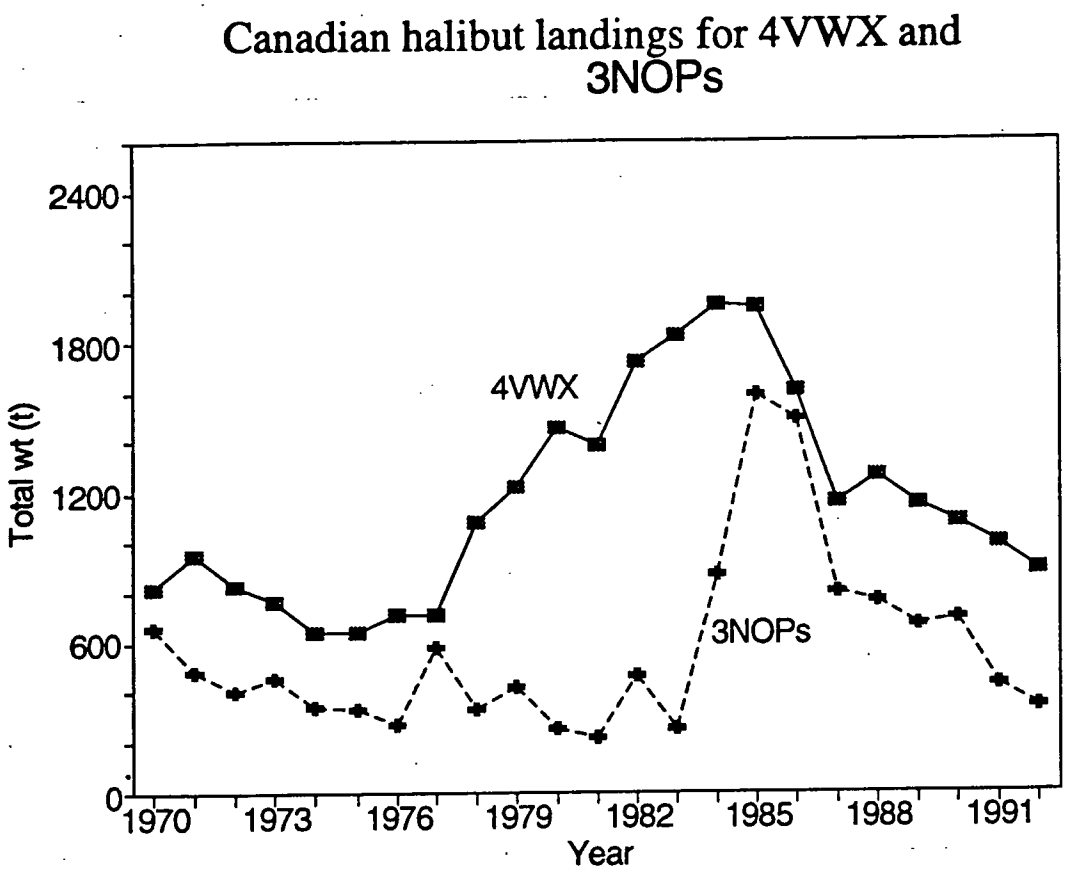


Figure 3a. Canadian halibut landings for divs. 4VWX and divs. 3NOPs.

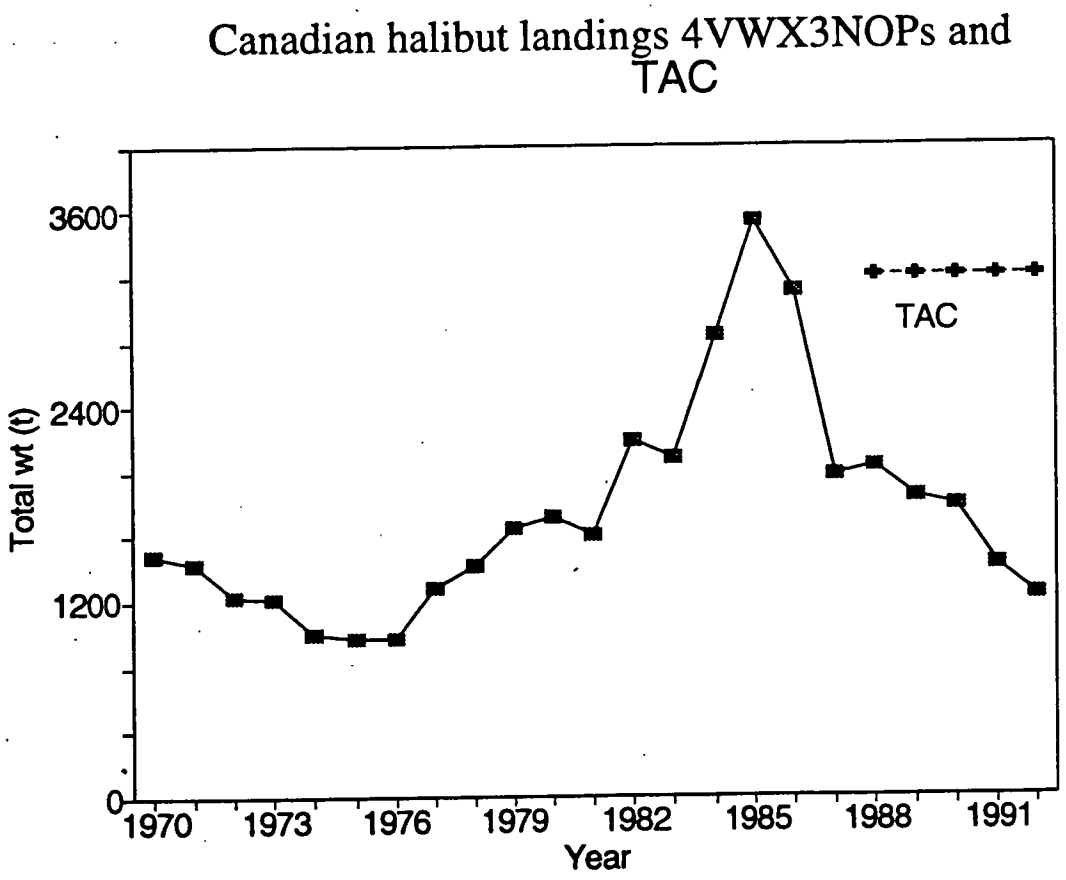


Figure 3b. Canadian halibut landings for divs. 4VWX and divs. 3NOPs (combined) versus the TAC.

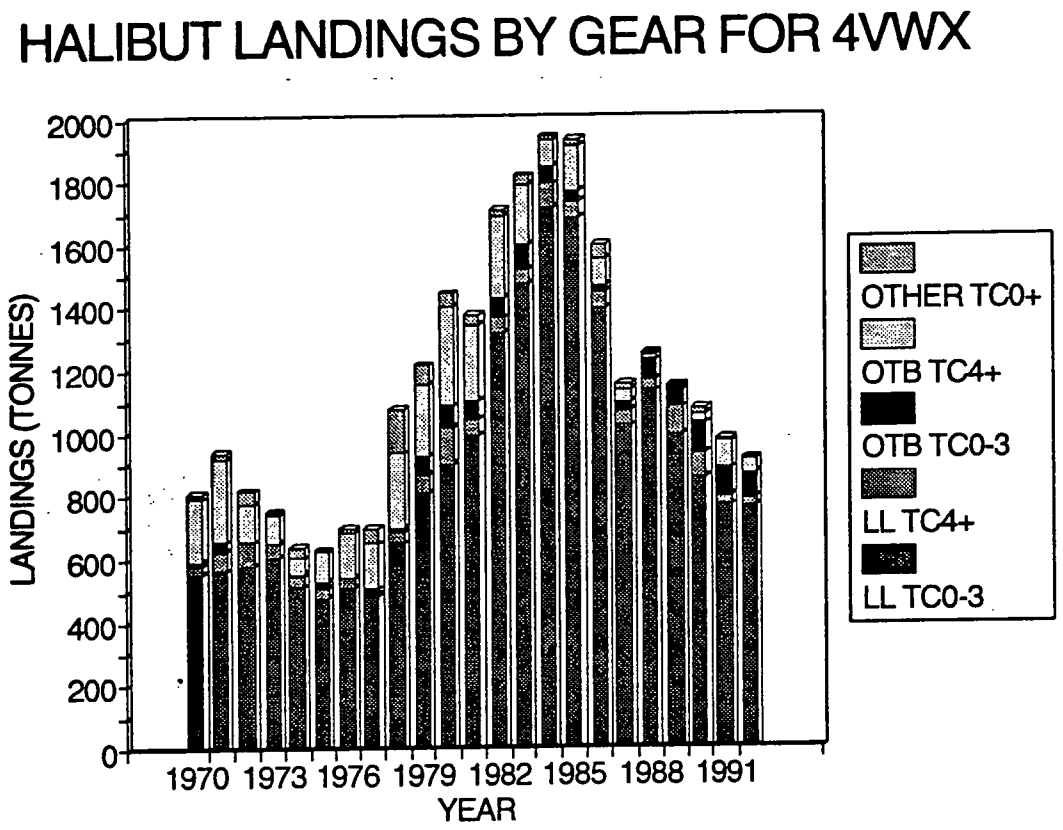


Figure 4a. Canadian (Maritimes and Quebec) halibut landings by gear for divs. 4VWX.

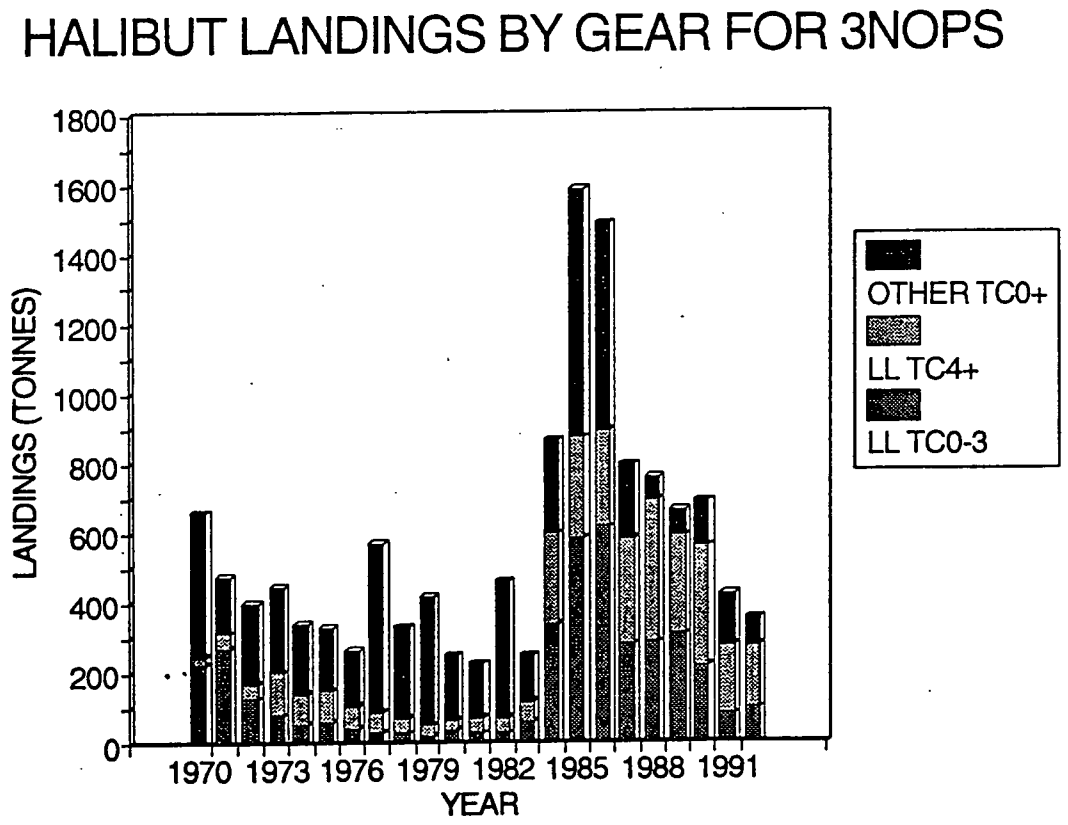


Figure 4b. Canadian (Maritimes and Quebec) halibut landings by gear for divs. 3NOPs.

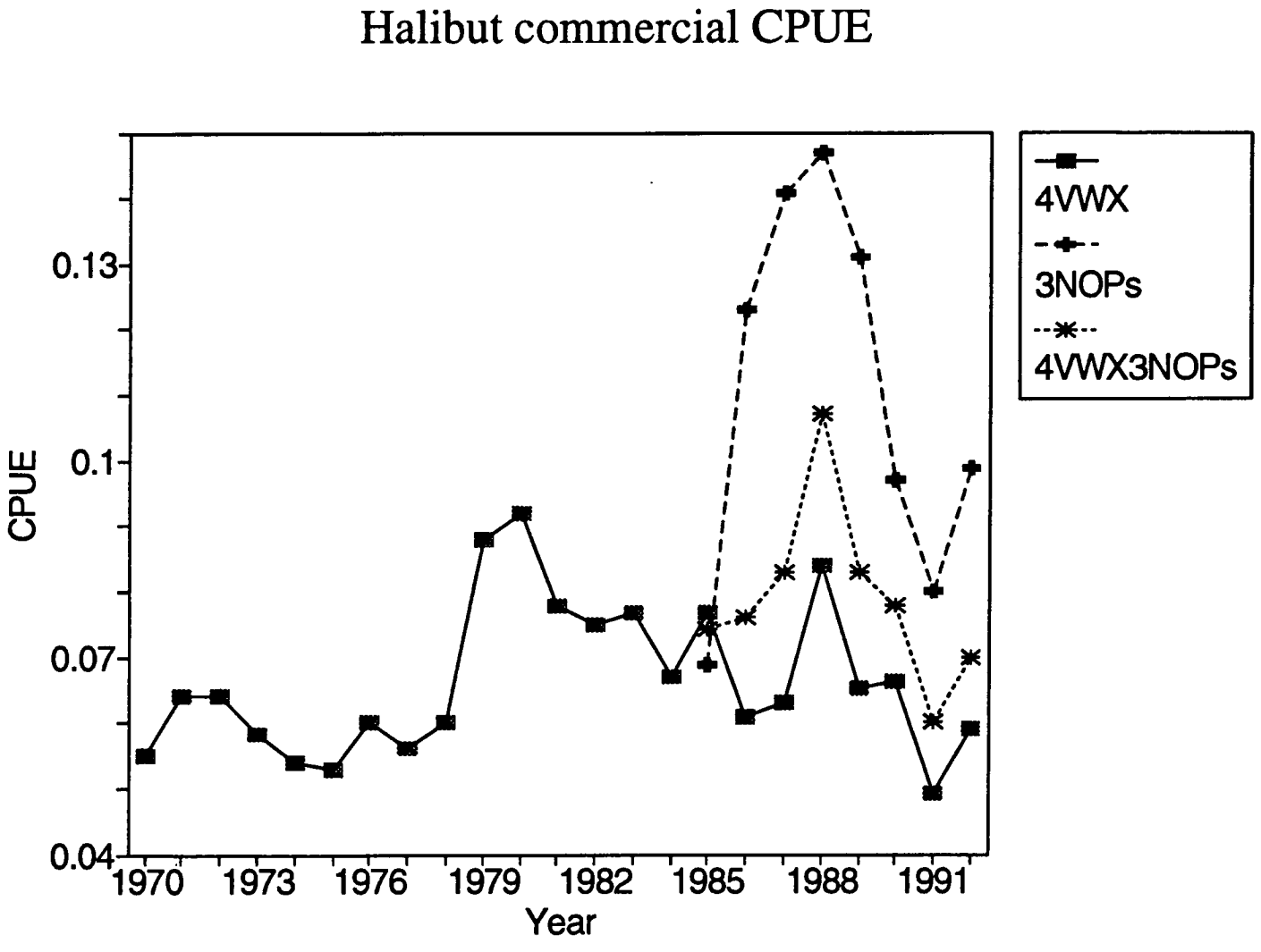
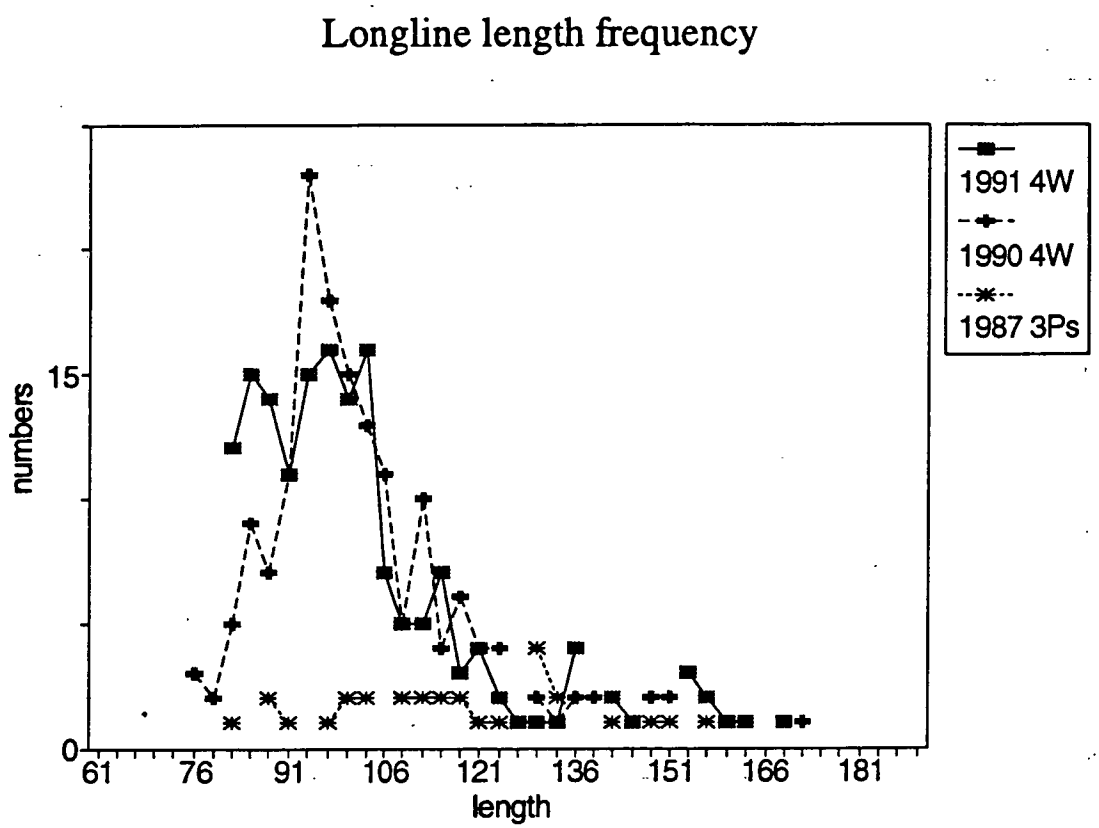


Figure 5. Commercial catch rates for halibut in divs. 4VWX and divs. 3NOPs and combined



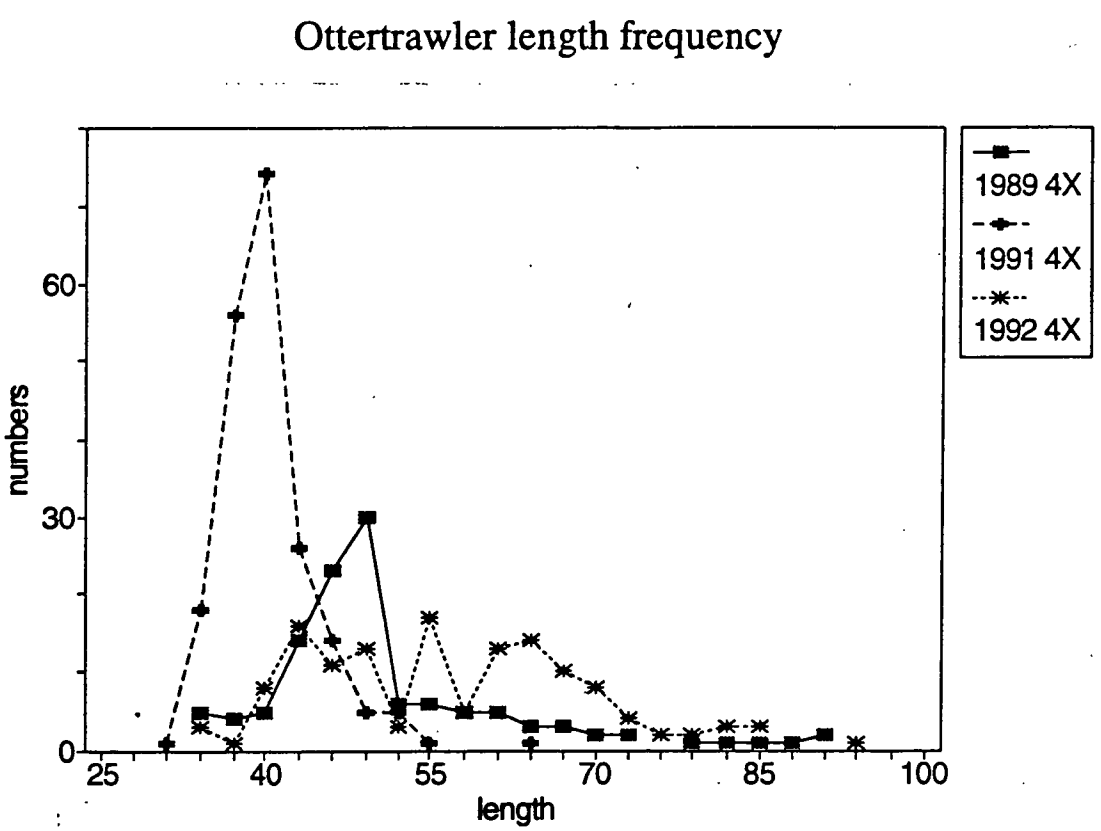
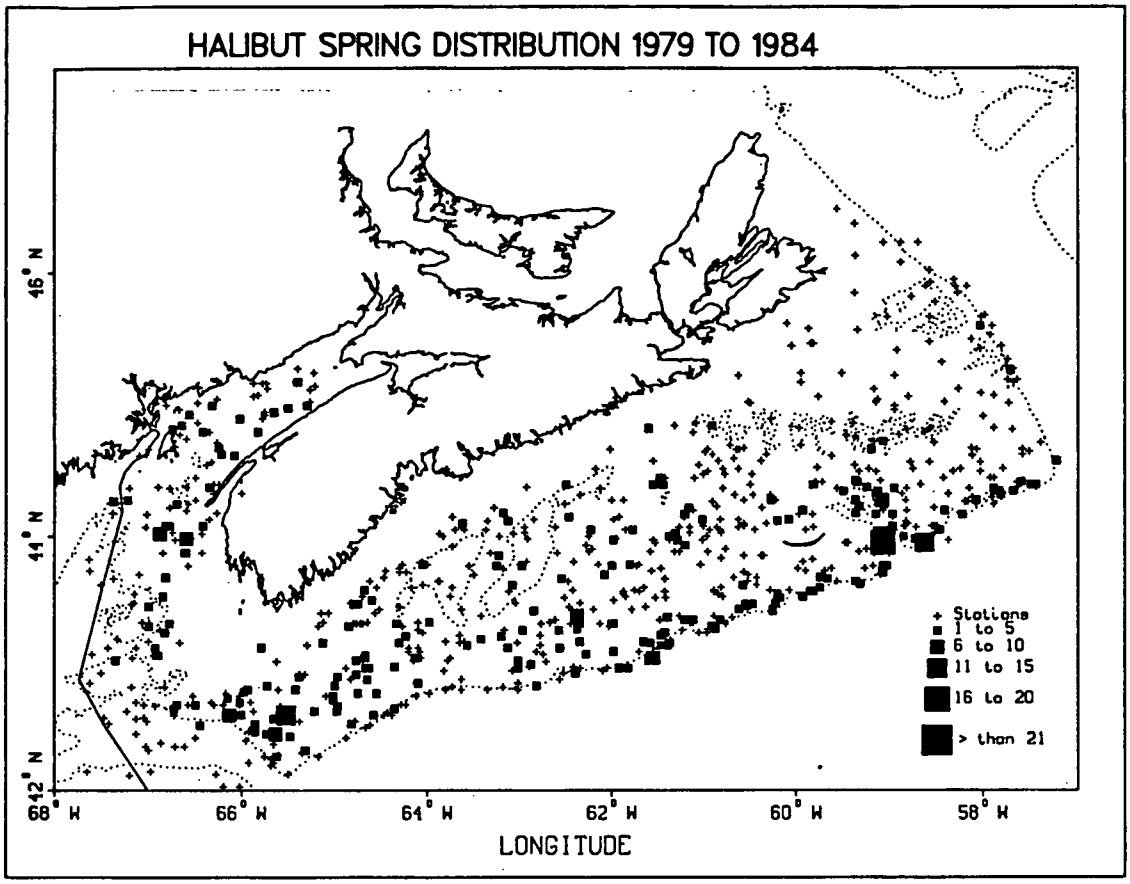


Figure 6. Commercial length frequencies for longliners and otter trawlers.



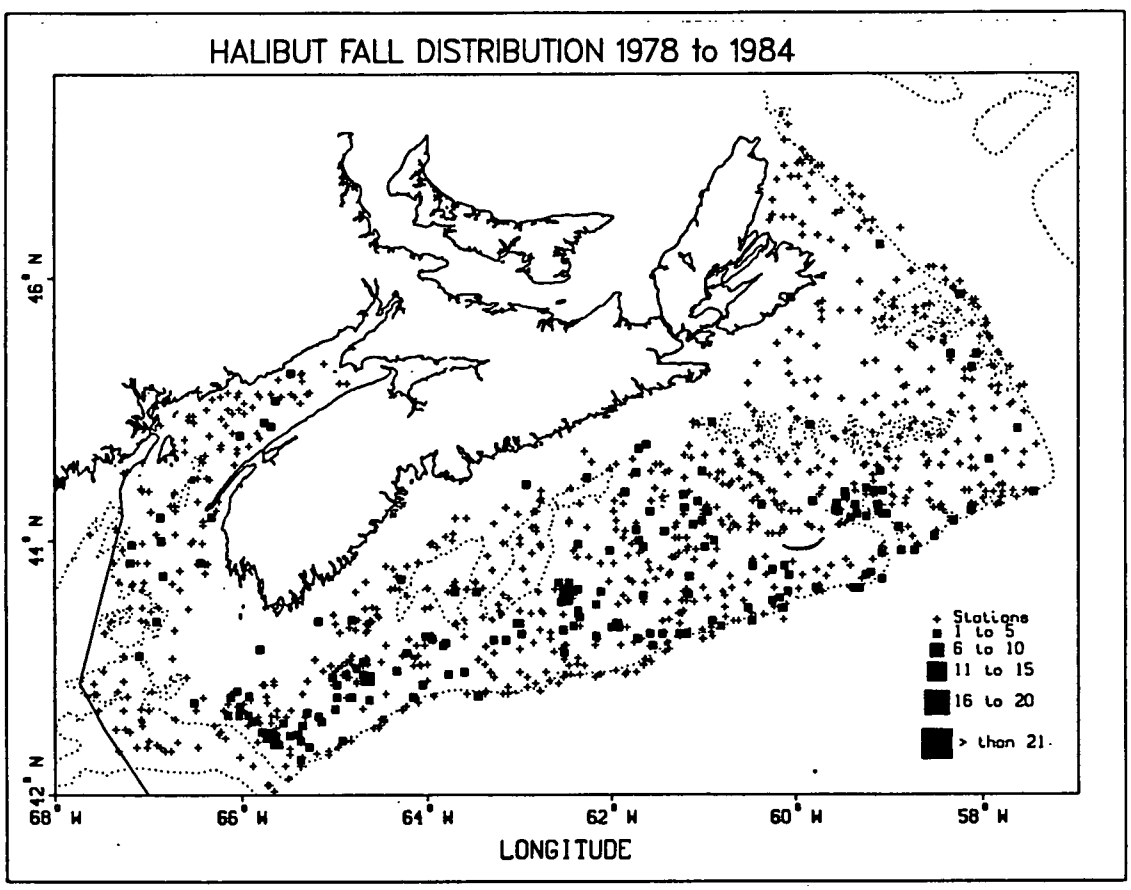
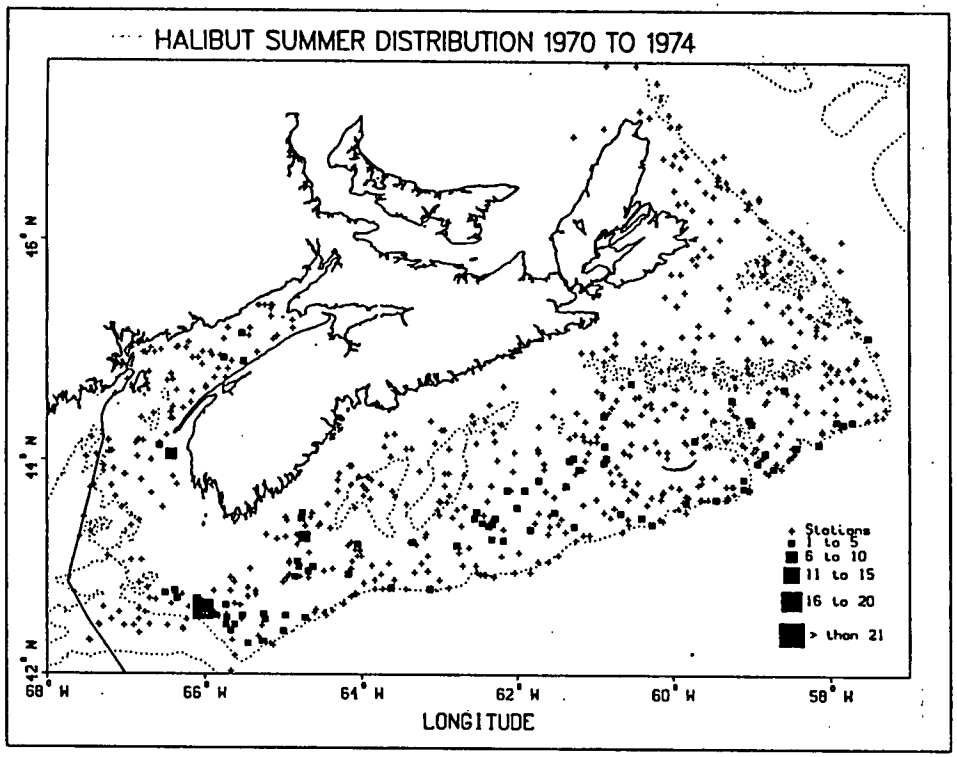
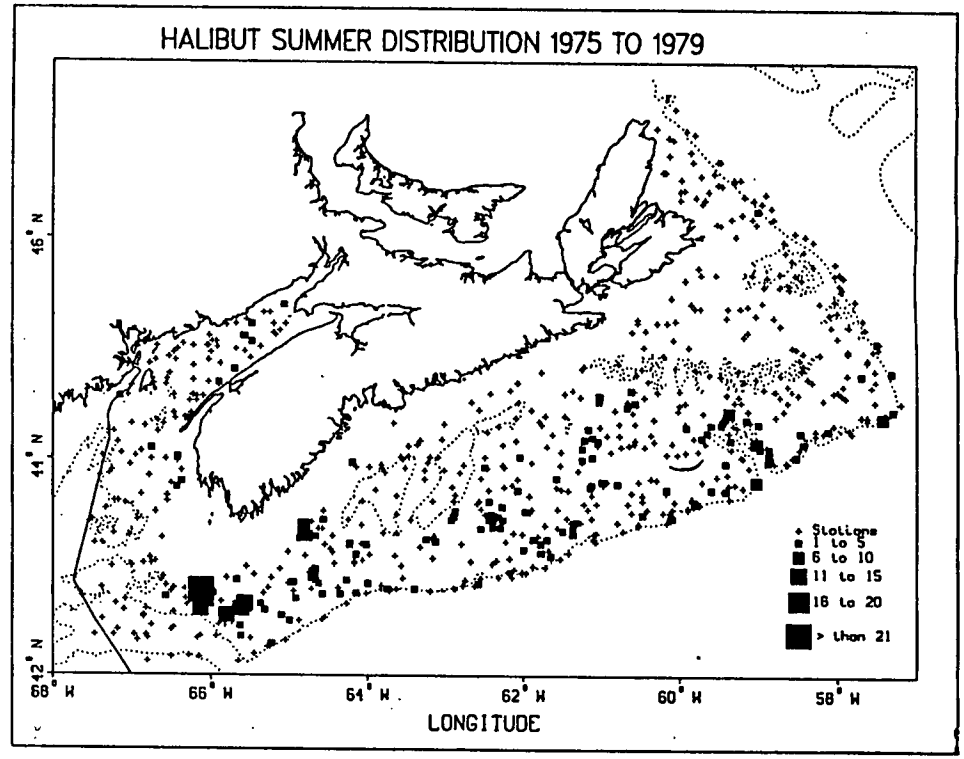


Figure 7. RV survey catches (nos / tow)





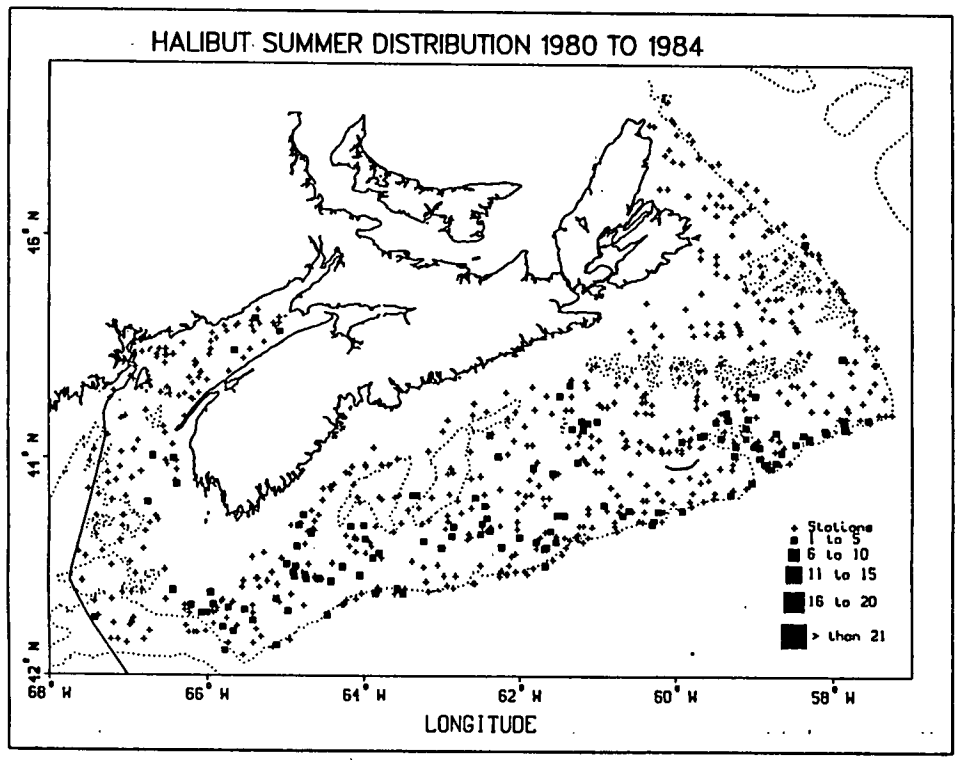
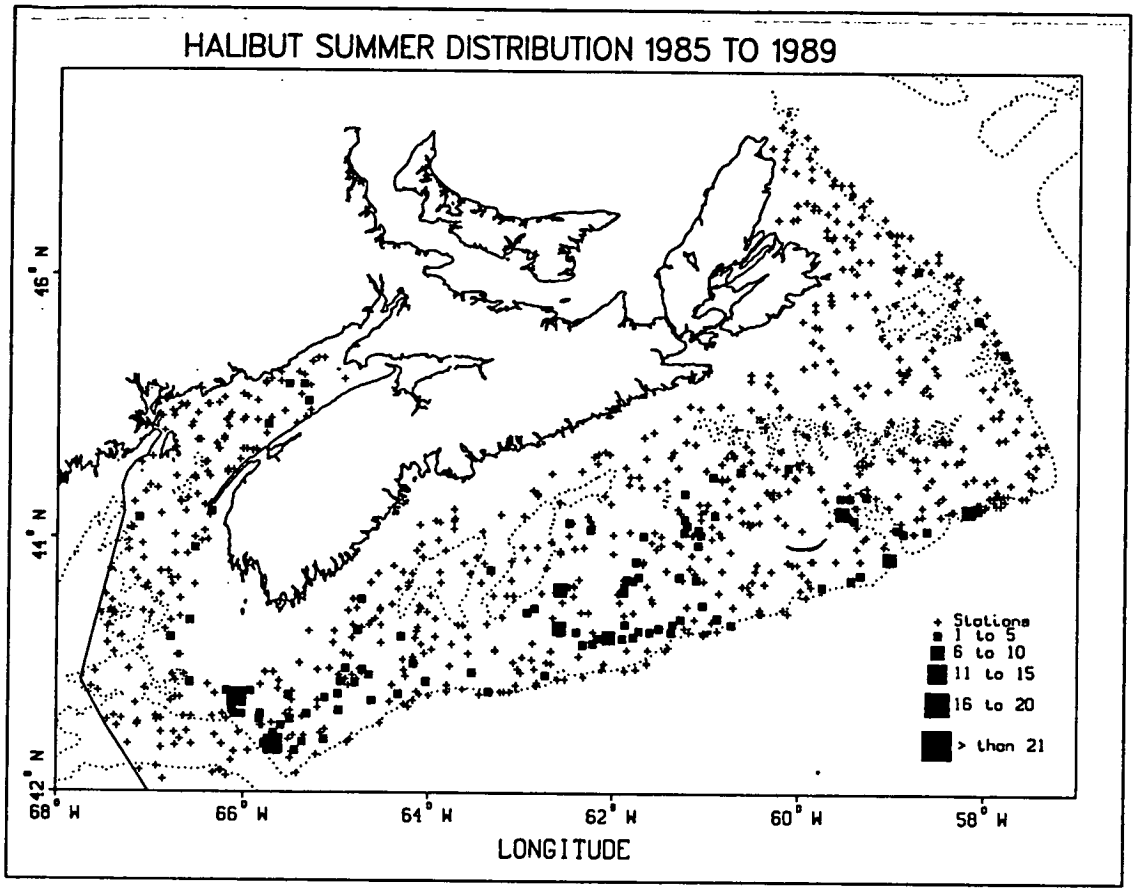


Figure 7. (continued)



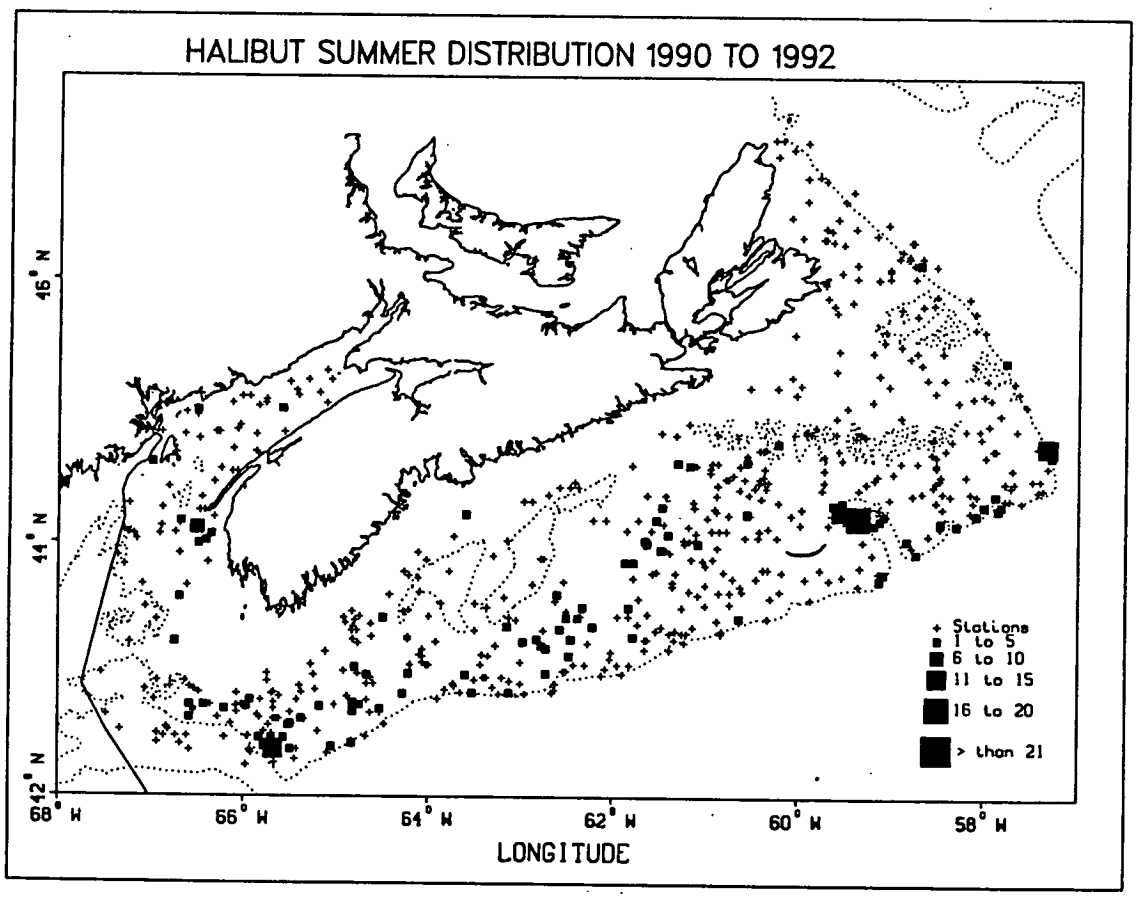


Figure 7. (continued)

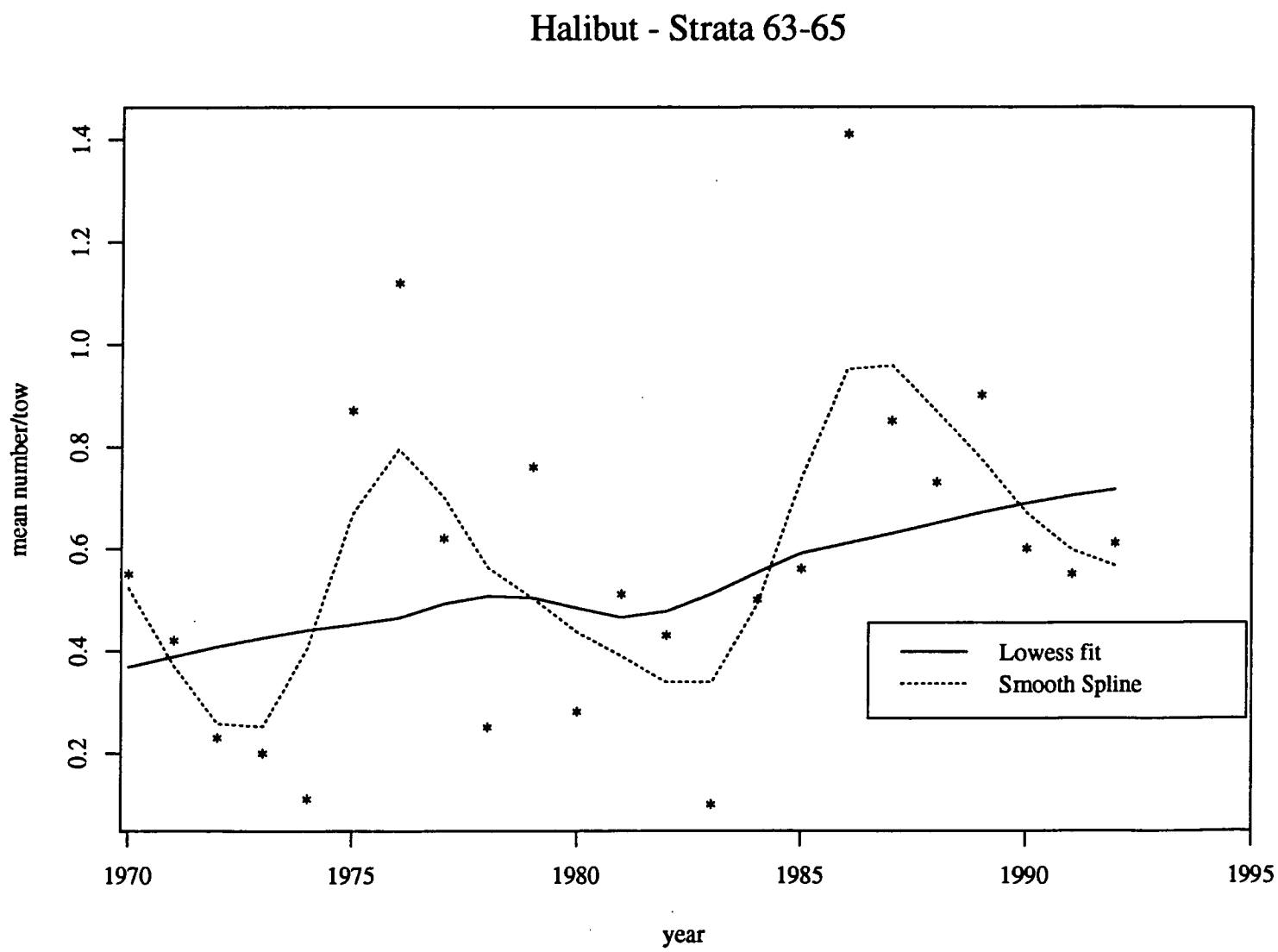
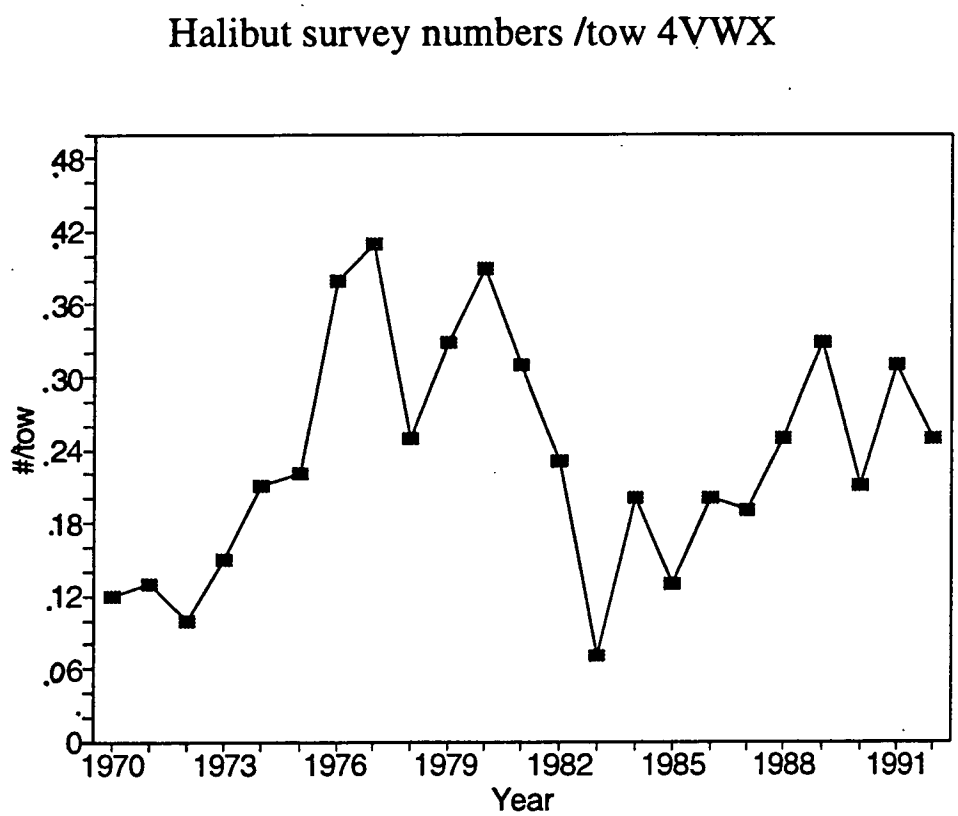


Figure 8. Halibut survey numbers for stratum associated with the Western Bank closed area.



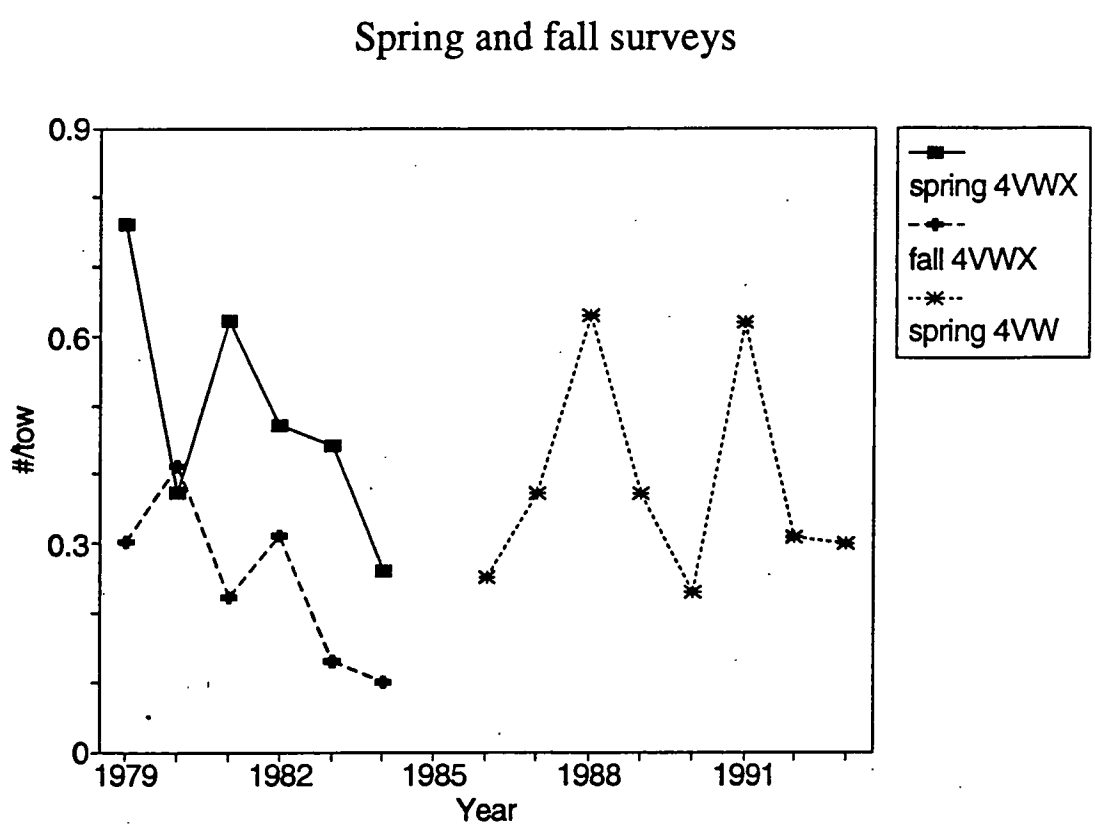


Figure 9. Halibut survey numbers for summer, spring and fall surveys.

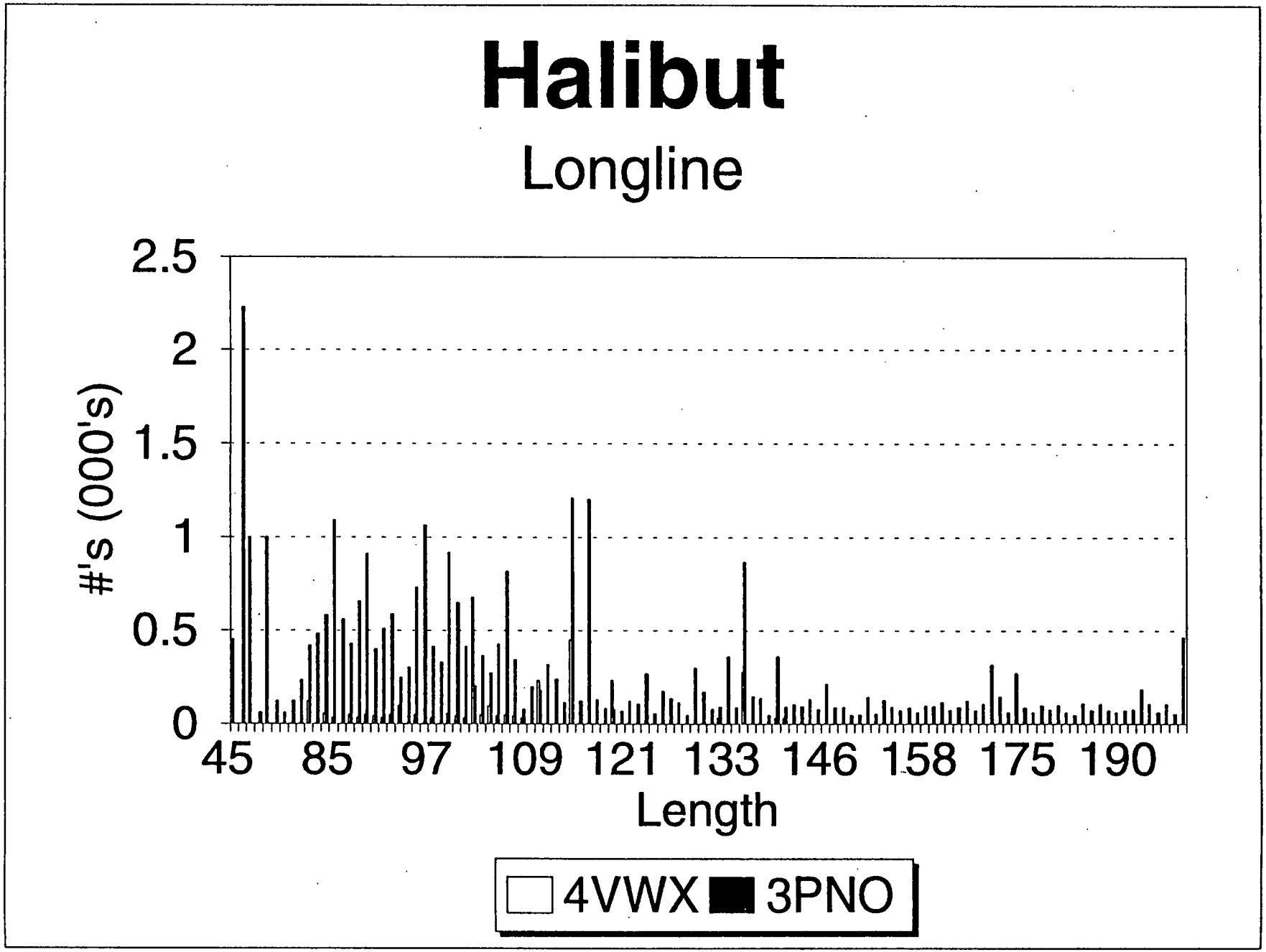


Figure 10. IOP length frequency distribution for 4VWX,3NOPs halibut fishery.

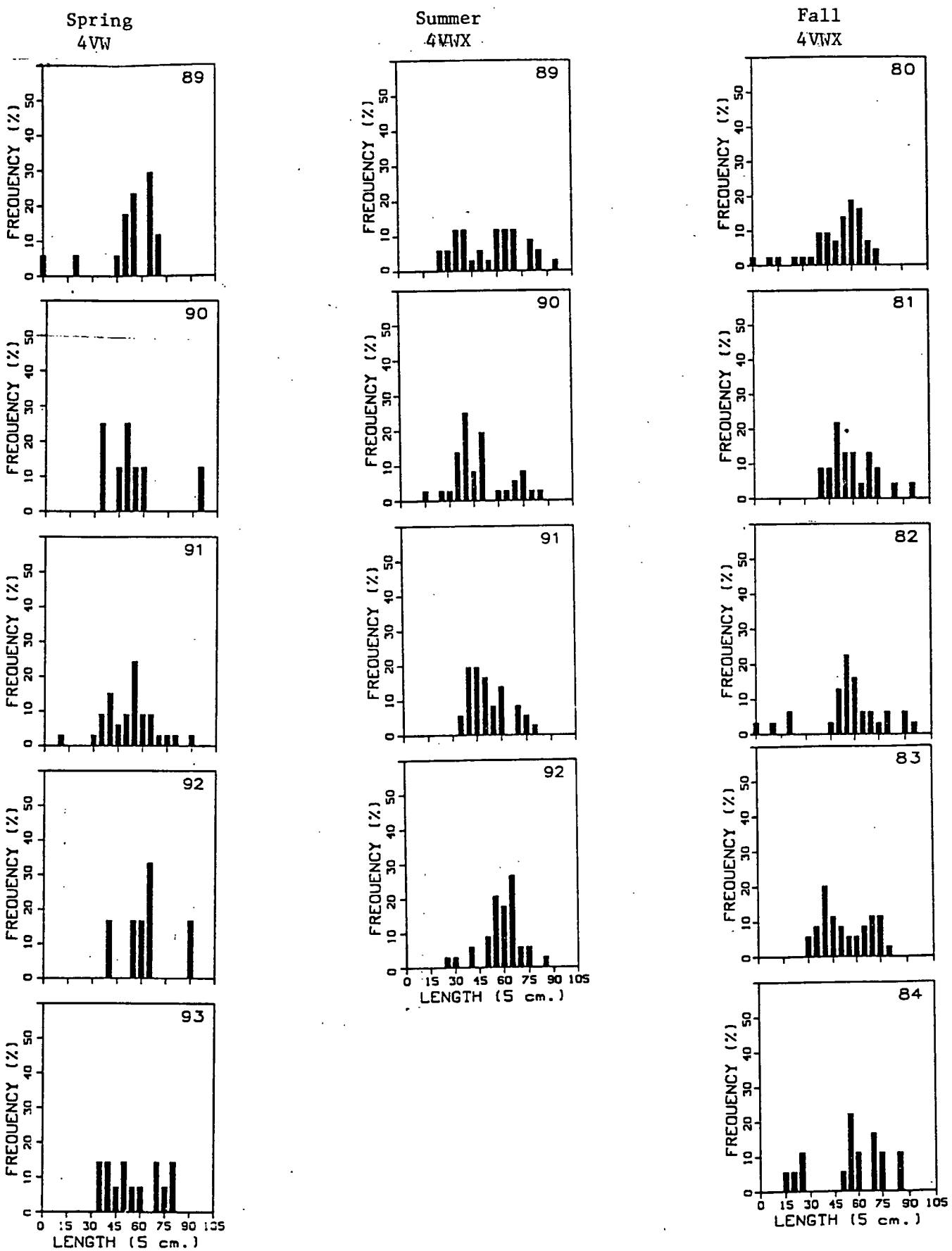


Figure 11. Length frequency for male halibut from 4VW spring, 4VWX summer and 4VWX fall research surveys.

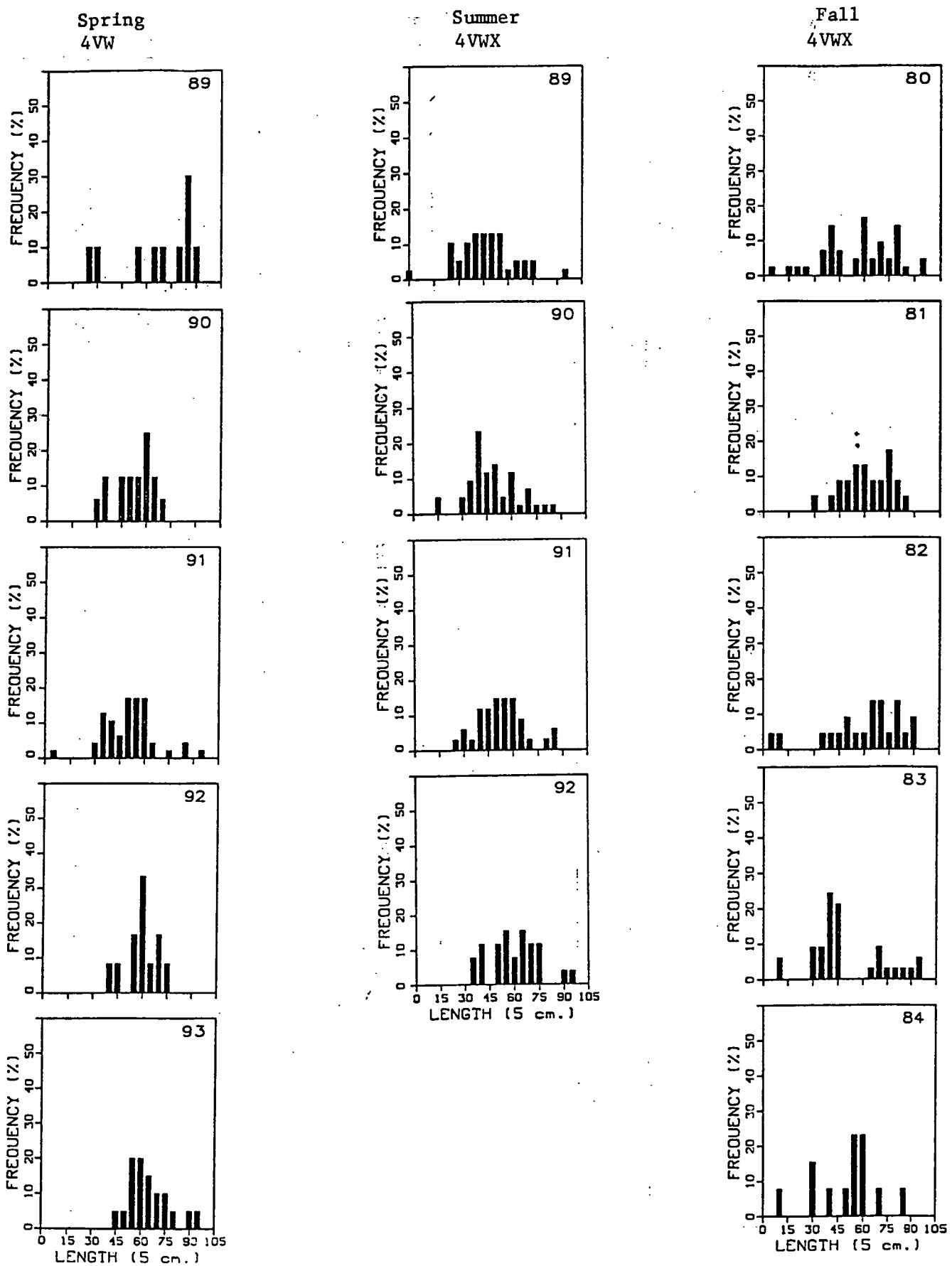


Figure 11. (continued) Length frequency for female halibut from 4VW spring, 4VWX summer and 4VWX fall research surveys.