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DFO Atlantic Fisheries
Research Document 95/33

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MPO Pêches de l'Atlantique
Document de recherche 95/33

The status of 2GH cod, 3LNO haddock, 3Ps haddock and 3Ps pollock

by

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¹La présente série documente les bases scientifiques des évaluations des ressources halieutiques sur la côte atlantique du Canada. Elle traite des problèmes courants selon les échéanciers dictés. Les documents qu'elle contient ne doivent pas être considérés comme des énoncés définitifs sur les sujets traités, mais plutôt comme des rapports d'étape sur les études en cours.

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Abstract

The cod stock (2GH) had reported catches as high as 94,000 t in 1966 but there has been no reported catch since 1991. Assessments have not been possible because adequate indices of abundance are not available. The last survey conducted in the fall of 1991 indicated that very few cod were present in the area in spite of reduced fishing in recent years.

The Grand Bank haddock stock (Div. 3LNO) supported a fishery with average yearly catches of 40,000 t from 1953 -1963. Catches from the mid 1960's to the early 1980's averaged 2,600 t but were less than 1,000 t for much of the 1970's. In the mid 1980's catches increased, peaking at 8,200 t in 1988. Catches have since declined to the 1970's level. Research vessel surveys indicate that yearclasses since 1980 have been weak.

For the St. Pierre Bank haddock stock (3Ps), landings increased from 5,800 t in 1953 to peak of 58,000 t in 1955 and declined to 6,000 t in 1957. Catches since 1960 have been mainly in the 1,000 to 2,000 t range, increasing to 7,500 and 5,400 t in 1985 and 1986. This increase was mainly due to increased effort by France. Provisional catch for 1994 is 21 t; this is the lowest catch on record. Survey abundance at age indicate that recent yearclasses are weak.

The 3Ps Pollock stock is small and generally does not occur in sufficient numbers to support a major commercial fishery. Catches were less than 1,000 t from 1967-1982. Catches gradually increased, peaking at 7,500 t in 1986. Catches have since declined to pre-1980 levels. Biomass was low in the 1970's (<1000 t), gradually increased to 7,900 t in 1987, and has since declined to pre 1980 levels.

Résumé

Les captures déclarées de morues (2GH) ont atteint 94 000 t en 1966, mais il n'y a eu aucune prise déclarée depuis 1991. Les évaluations sont impossibles parce qu'on ne dispose pas d'indices d'abondance appropriés. Le dernier relevé réalisé à l'automne 1991 indiquait qu'il y avait très peu de morues dans la zone, malgré la diminution des activités de pêche depuis quelques années.

Le stock d'aiglefin du Grand Banc (div. 3LNO) a soutenu une exploitation de l'ordre de 40 000 t, en moyenne, de 1953 à 1963. Les prises, du milieu des années 1960 au début des années 1980, se chiffraient en moyenne à 2 600 t, mais sont demeurées sous la barre des 1 000 t pendant une grande partie des années 70, avant d'augmenter, vers le milieu des années 80, pour atteindre un sommet de 8 200 t en 1988. Depuis, elles sont revenues au niveau des années 70. Les relevés effectués par navire de recherche indiquent que les classes d'âge sont faibles depuis 1980.

Quant au stock d'aiglefin du banc Saint-Pierre (3Ps), il a fourni des débarquements oscillant entre 5 800 t en 1953 et un sommet de 58 000 t en 1955, avant de retomber à 6 000 t en 1957. Depuis 1960, les prises se sont maintenues entre 1 000 t et 2 000 t, avec une pointe à 7 500 t et 5 400 t en 1985 et 1986. Cette augmentation est principalement attribuable à l'accroissement de l'effort de pêche de la France. Les données provisoires pour 1994 sont de 21 t, c'est-à-dire le niveau le plus bas jamais enregistré. L'abondance par âge, mesurée d'après les résultats du relevé, indique que les récentes classes d'âge sont faibles.

Les effectifs du stock de goberge de 3Ps sont limités et généralement insuffisants pour soutenir une exploitation commerciale d'une quelconque ampleur. Les prises ont été inférieures à 1 000 t de 1967 à 1982. Elles ont graduellement augmenté par la suite, atteignant un sommet de 7 500 t en 1986. Depuis lors, elles sont revenues à leur niveau d'avant 1980. La biomasse était faible au cours des années 70 (< 1 000 t), puis a augmenté graduellement jusqu'à 7 900 t en 1987, avant de retomber aux niveaux d'avant 1980.

Introduction

Cod along the northern Labrador coast are managed as a stock delimited by NAFO divisions 2G and 2H. These cod overwinter along the continental slopes off Labrador from Saglek Bank to Hamilton Bank and migrate during the summer to coastal area of northern and southern Labrador and northern Newfoundland. This distribution overlaps that of the 2J3KL cod stock complex to a large degree.

The decline of the 2GH cod stock preceded the decline of cod stocks in 2J3KL, 3NO and 3Ps. Catches in Divisions 2GH have been very low since the mid 1980's and non-existent since 1991.

In southern Newfoundland waters pollock are clearly at the northern extent of their range and this may be true for haddock. Haddock and pollock stocks are currently at low levels and recovery may be dependant on changes in conditions in the environment. These changes may also lead to the recovery of the cod stocks in the area.

2GH Cod

This stock was last reviewed in 1992 (Murphy, et al 1992). This document provides no update of data and Table 1 and Figure 1 are provided to reflect that no fishery has taken place on this stock since 1991. Figures 2 and 3, are provided to define the area the stock covers.

One area of concern raised in 1992 was the impact of discarding in the shrimp fishery, on the recovery of the stock. In 1994 bycatch management areas were put in place for the shrimp fishery. The current protocol requires mandatory use of the Nordmore grate in some shrimp management areas and its use in other areas when total groundfish by-catch exceeds 300 kg. per day. These measures have been quite effective in reducing the by-catch of cod. Estimates from observer data show it has declined from 34 t in 1992 to 1.1 t in 1994 (Kulka, 1995).

3LNO Haddock

Commercial catch

Historically, landings for the Canadian fleet were highest in Division 3O and were mainly taken during January to May period in warmer slope waters. Landings were highest during the 1950's and early 1960's, with a maximum of 76,000 t in 1961. But remained low from the 1960's to mid 1980's as a result of poor recruitment. As the relatively strong 1980 and 1981 yearclasses recruited to the fishery landings increased to 8,200 t in 1988, the highest since 1967, and have since declined to less than 1,000 t (Table 2; Figure 4). In recent years catches have been taken as by-catch in cod and flatfish fisheries. The moratorium on directed fisheries for the cod and flatfish stocks imposed in 1994 by NAFO have led to reduced catches. Provisional catch for 1994 is 8 t, the lowest catch on record.

Research surveys

Research vessel surveys have been conducted by Canada in Div. 3LNO since the early 1970's using the stratified-random design (Figure 5). Biomass and abundance estimates were very low until 1982 when there was a substantial increase. The mean number and weight per tow were

highest in 1984, declined sharply in 1985, and showed a moderate increase again in 1988. Both indices have remained low since that time. The standard deviation associated with these estimates were generally large (Table 3; Figure 6) as the result of highly variable catches from a small number of strata (Table 4-5).

Mean numbers per tow at age (Table 6) shows that the sharp increase in abundance in the mid 1980's resulted from the appearance of the moderately successful 1980 and 1981 yearclasses. Other yearclasses also appear to have been moderately successful (1982 and 1983) and were responsible for sustaining a higher than normal abundance and biomass until 1988. These recruiting yearclasses resulted in higher catches in the mid to late 1980's and were given little chance to contribute to the spawning stock biomass. Since 1983, year-classes have been weak.

3Ps Haddock

Commercial Catch

Haddock were not known to exist in abundance on St. Pierre Bank before 1950 (Hodder, 1966). The appearance of the very abundant 1949 yearclass led to an increase in catches with a peak at 58,000 t in 1955 (Table 7, Figure 7). Yearclass survival since has been poor and catches declined and remained low especially in the 1970's. The relatively abundant 1981 yearclass recruited to the fishery and catches showed a significant increase beginning in 1984 and peaked at 7,500 t in 1985 mainly as a result of increased catches by France. Catches have declined since 1985 and have been less than 500 t since 1992.

Research surveys

Research vessel surveys have been conducted by Canada in NAFO Subdivision 3Ps since 1972 using the stratified-random design (Figure 8). Biomass and abundance estimates were highest in 1985 and have since declined (Table 8, Figure 9). Survey catch at age (Table 9) show this was the result of relatively good recruitment of the 1981 yearclass. This increase in abundance and biomass corresponded with increases in catch and the recruiting yearclass was fished out before being given a chance to contribute to the spawning stock biomass. The timing of this survey has varied, but biomass in recent years has been found mainly in strata with depths of 100-200 fathom (Table 10).

Pollock

Commercial Catch

Pollock landings in Subdivision. 3Ps averaged 420 t from 1967 to 1982, increased to a high of in 1986 of 7,554 t then subsequently declined to 1,305 t in 1991. Canadian catch in 1992 was only 473 t and the TAC of 600 t recommended by CAFSAC for 1993 has been reduced to 100 t for 1995 (Table 11, Figure 10). Catches in recent years have been mainly by Canada and France.

Research Survey Data

Research vessel surveys have been conducted in Subdivision 3Ps using the stratified random design since 1972. (Figure 8) These surveys have been conducted mainly in the February - March period and are used in assessing most commercial groundfish species. In 1993 the survey

period was shifted to April to lessen the impact of cod migrating from the Gulf of St. Lawrence on the 3Ps cod assessment. Pollock biomass estimates from the surveys were low in the 1970's (< 1,000 t) increased to a high of 7,877 t in 1987 and have since declined to 1970's levels (Table 12; Figure 11). Survey catches for most of the time period have been highest (Table 13.) from strata surrounding Burgeo Bank (306-309) and to a lesser degree those on the slopes of St. Pierre Bank (strata 310, 313,318,706 and 707). In recent surveys, catches seem to be confined to the strata along the slope (strata 310, 313,318, and 707).

Comments

Canada has not conducted a research survey in 2GH since the fall of 1991, when very few cod were found. There is no information on current stock status. Surveys in recent years in 2J have shown no sign of recovery in the north.

Haddock in Newfoundland waters are thought to be at the northern extent of their range in the Northwest Atlantic. Cold waters throughout the area in recent years have probably been restrictive to their distribution and behaviour. In an attempt to explain poor recruitment Templeman (1966) offered the environment as a possible factor. Since haddock spawn on the slopes of St. Pierre Bank and the southern Grand Bank they are at the mercy of the currents. In some years bank waters with larvae in it circulate mainly on the bank and larvae can settle in suitable conditions. In other years bank waters are caught up in eddies of the Gulf Stream and larvae may settle in waters too deep and warm. Survival of yearclass is at best marginal.

However history has shown that occasionally the correct conditions prevail and yearclass survival is extremely good. This situation occurred in NAFO Divisions 3LNO with the 1950 and 1956 yearclasses and in NAFO Subdivision 3Ps with the 1949 yearclass. In both areas these strong yearclasses sustained substantial fisheries for a number of years.

In reviews of this stock during the late 1980's and early 1990's CAFSAC advised that there be no directed fishery on these stocks. It was felt that yield could be enhanced from incoming yearclasses and these yearclasses should also be allowed to contribute to the spawning stock. However in the late 1980's and early 1990 TAC's were established. In the 3Ps the TAC was initially set at 150 t in 1987, this increased to 3,200 t for 1989 -1992 period. In 3LNO the TAC was initially set at 4,100 t in 1987, this increased to 10,000 t in 1990. Biomass and abundances estimates presented for these stocks in the 1992 assessment had declined to show values similar to the 1970's. The advice in 1992 was for no directed fishery. A TAC of 500 t, restricted to by-catch, was established for 1993 and 1994. The FRCC 1994 Report for both stocks advised a 100 t bycatch TAC for 1995. This document presents no data that indicate this advice should be revised.

Pollock have not been a major component of the commercial fishery in NAFO Subdivision 3Ps. Their contribution is based on the occurrence, and survival of yearclasses against great odds in the extreme north of their range. Recent surveys show biomass and abundance are low for all size ranges of pollock. However, in the spring of 1995 schools of small pollock have been observed in south coast harbours and this may be seen as a positive sign.

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Table 1. Cod landings from NAFO Divisions 2GH 1953-1994

Year	Canadian	Foreign Total	TAC	
1953	778	51409	53,717	
1954	1654	45	1,699	
1955	743	22	765	
1956	146	32	178	
1957	963	0	963	
1958	1585	943	2,528	
1959	1321	1831	2,994	
1960	1,000	7,000	8,000	
1961	1,000	3,000	4,000	
1962	1,199	3,735	4,934	
1963	930	3,084	4,014	
1964	829	8,318	9,147	
1965	1,217	63,028	64,245	
1966	1,311	92,878	94,189	
1967	4	56,131	56,135	
1968	523	83,894	84,417	
1969	320	63,297	63,617	
1970	75	17,712	17,787	
1971	7	12,632	12,639	
1972	4	13,686	13,690	
1973	3	294	297	
1974	0	4,070	4,070	20,000
1975	7	6,952	6,959	20,000
1976	39	5,890	5,929	20,000
1977	41	3,617	3,658	20,000
1978	37	4,821	4,858	20,000
1979	126	2,054	2,180	20,000
1980	106	2,512	2,618	20,000
1981	405	3,245	3,650	20,000
1982	3,252	10,259	13,511	20,000
1983	265	2,116	2,381	20,000
1984	252	1,279	1,531	20,000
1985	229	318	547	20,000
1986	345	149	494	20,000
1987	8	126	134	20,000
1988	496	0	496	20,000
1989	449	0	449	20,000
1990	431	16	447	20,000
1991	0	0	0	20,000
1992 ^a	0	0	0	20,000
1993 ^a	0	0	0	1,000
1994 ^a	0		0	1,000
1995				200 ^b

a Provisional

b Any directed fishery to be fished under a scientific protocol.

Table 2. Historical catches of haddock by Canada from NAFO Divisions 3L, 3N, and 3O, and Foreign catch from NAFO Divisions 3LNO combined.

Year	Canada			Total	Foreign	Total	Tac
	3L	3N	3O		Total	3LNO	
1953	143	100	7978	8,221	304	8,525	
1954	292	695	4773	5,760	19,907	25,667	
1955	126	320	2759	3,205	41,109	44,314	
1956	93	1,663	21463	23,219	27,199	50,418	
1957	65	1,721	28546	30,332	28,046	58,378	
1958	185	6,517	16335	23,037	16,933	39,970	
1959	715	2,694	17195	20,604	7,675	28,279	
1960	53	1,246	15684	16,983	45,159	62,142	
1961	36	803	28527	29,366	47,057	76,423	
1962	21	925	26707	27,653	5,680	33,333	
1963	5	289	8269	8,563	3,676	12,239	
1964	101	715	4963	5,779	2,868	8,647	
1965	9	512	1723	2,244	4,103	6,347	
1966	21	560	489	1,070	6,208	7,278	
1967	11	60	370	441	8,417	8,858	
1968	74	19	188	281	3,450	3,731	
1969	69	37	406	512	1,215	1,727	
1970	108	37	209	354	2,279	2,633	
1971	225	5	26	256	3,151	3,407	
1972	74	28	67	169	2,265	2,434	
1973	50		19	69	1,074	1,143	
1974	17	1	9	27	1,417	1,444	
1975	5	1	9	15	1,283	1,298	
1976	5	2	45	52	86	138	
1977	2	2	69	73	64	137	
1978	13	9	356	378	106	484	
1979	20	6	528	554	301	855	
1980	22	44	107	173	5	178	
1981	28	12	75	115	9	124	
1982	27	9	839	875	94	969	
1983	39	6	170	215	337	552	
1984	158	26	1285	1,469	1,382	2,851	
1985	170	80	3044	3,294	719	4,013	
1986	483	226	6034	6,743	596	7,339	
1987	470	720	3198	4,388	1,272	5,660	4,100
1988	132	492	7122	7,746	501	8,247	8,100
1989	66	235	5989	6,290	410	6,700	8,100
1990	26	95	2931	3,052	120	3,173	10,000
1991	16	11	1078	1,105	162	1,267	4,100
1992 ^a	8	24	795	827	166	994	4,100
1993 ^a	0	1	856	857	10	867	500
1994 ^a	0	0	8	8	0	8	500
1995							100 ^b

^a Provisional

^b By-catch

Table 3 . Haddock biomass and abundance from stratified random research surveys,
(Divisions 3N and 3O combined).

Year	Biomass		Abundance		Mean no. Mean wt.	
	(t)	1std	(000's)	1std	per tow	per tow (kg.)
1973	459	263	306	244	0.14	0.21
1975	631	2611	379	514	0.19	0.31
1976	438	2065	1387	598	0.61	0.19
1977	215	177	325	110	0.13	0.09
1978	4079	4082	4587	3750	1.85	1.65
1979	913	303	1533	1167	0.59	0.35
1980	1401	358	745	182	0.29	0.55
1981	64	267	430	605	0.24	0.04
1982	11882	11466	79888	88440	30.93	4.6
1984	54873	12796	104284	26955	40.17	21.14
1985	12244	27069	18512	41041	7.13	4.72
1986	15901	51443	24017	83288	9.25	6.13
1987	21240	16850	21123	13710	8.18	8.22
1988	41692	30829	33407	24758	12.87	16.06
1989	2859	1327	1871	538	0.72	1.1
1990	11603	13503	7190	8266	2.95	4.75
1991	2836	7232	4830	3278	1.79	1.05
1992	999	853	1397	1355	0.52	0.37
1993	2702	527	2527	9579	0.94	1
1994	4057	1902	2871	1273	1.04	1.48

Table 4. Haddock biomass (t) estimates by stratum from Canadian spring stratified random research vessel surveys in NAFO Division 3N.

Depth Range (fm)	Strata	Area (sq.mi.)	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
<= 30	375	1593	0	0	0	0	nf	0	0	0	0	0	0
	376	1499	0	0	nf	0	0	0	0	0	0	0	0
31-50	360	2992	25	nf	nf	0	0	0	0	0	0	0	0
	361	1853	52	0	0	0	0	0	0	0	89	nf	7
	362	2520	0	0	0	0	0	0	0	0	0	8	5
	373	2520	0	0	0	nf	0	0	0	0	0	0	0
	374	931	0	0	0	0	nf	0	0	0	0	0	0
	383	674	0	0	0	nf	0	0	0	0	0	0	0
51-100	359	421	38	0	nf	nf	7	0	nf	0	0	21	48
	377	100	0	0	0	0	nf	0	0	0	0	0	0
	382	647	0	0	0	nf	0	0	0	0	0	0	0
101-150	358	225	0	38	nf	nf	nf	29	nf	8	0	0	20
	378	139	0	0	0	nf	nf	1	0	0	0	0	0
	381	182	3	0	0	0	nf	0	0	0	0	0	0
151-200	357	164	nf	0	nf	nf	nf	0	nf	0	0	0	3
	379	106	nf	0	0	nf	nf	0	0	0	0	0	0
	380	116	0	0	0	nf	nf	0	nf	0	0	0	nf

Depth Range (fm)	Strata	Area (sq.mi.)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
<= 30	375	1593	2679	22	0	6	0	0	0	0	0	0	0
	376	1499	0	0	0	0	0	0	0	0	0	0	0
31-50	360	2992	160	0	112	12	0	0	0	0	0	0	0
	361	1853	7514	755	14	0	0	0	0	0	0	0	0
	362	2520	7783	0	0	0	0	0	0	0	0	0	0
	373	2520	2337	0	0	0	0	0	0	0	0	0	0
	374	931	3294	0	0	0	0	0	0	0	0	0	0
	383	674	0	0	0	0	0	0	0	0	0	0	0
51-100	359	421	8	0	3	0	0	41	0	0	0	0	0
	377	100	0	0	0	1	0	0	0	0	0	0	0
	382	647	0	0	0	0	0	0	0	0	0	0	0
101-150	358	225	182	25	0	7	2	0	0	0	0	0	0
	378	139	0	0	0	0	0	0	0	0	0	0	0
	381	182	0	0	0	0	0	0	0	0	0	0	0
151-200	357	164	0	0	0	nf	0	0	0	0	1	0	0
	379	106	0	0	0	0	0	0	0	0	0	0	0
	380	116	0	0	0	0	0	0	0	0	0	0	0

nf strata not fished

Table 5. Haddock biomass (t) estimates by stratum from Canadian stratified random research vessel surveys in NAFO Division 3O.

Depth Range (fm)	Strata	Area (sq. mi.)	1973	1975	1976	1977	1978	1979	1980	1981	1982	1984
31-50	330	2089	0	0	0	0	0	325	0	0	0	0
	331	456	0	0	0	nf	0	18	0	nf	0	0
	338	1898	0	3230	0	64	0	42	85	nf	74	8491
	340	1716	nf	0	0	0	0	0	0	0	13	10
	351	2520	0	0	0	0	0	51	0	0	99	161
	352	2580	0	0	0	17	0	0	0	nf	14	11371
51-100	353	1282	266	0	0	0	0	18	0	nf	1219	698
	329	1721	0	nf	304	0	2710	1	0	0	0	0
	332	1047	0	250	36	0	619	53	153	nf	99	9647
	337	948	22	43	16	0	582	359	119	nf	9678	498
	339	585	0	0	nf	nf	0	0	nf	0	23	0
	354	474	67	nf	51	0	0	8	0	36	0	36
101-150	333	147	nf	8	0	63	0	12	326	nf	237	0
	336	121	44	0	0	40	0	19	288	nf	204	0
	355	103	0	8	0	nf	nf	0	123	0	112	6
151-200	334	96	nf	nf	0	0	0	0	190	nf	26	0
	335	58	16	nf	0	nf	nf	0	7	nf	0	0
	356	61	0	nf	nf	nf	nf	0	21	0	nf	0
201-300	717	166	nf	nf	nf	nf	nf	nf	nf	nf	nf	nf
	719	76	nf	nf	nf	nf	nf	nf	nf	nf	nf	nf
	721	76	nf	nf	nf	nf	nf	nf	nf	nf	nf	nf
301-400	718	134	nf	nf	nf	nf	nf	nf	nf	nf	nf	nf
	720	105	nf	nf	nf	nf	nf	nf	nf	nf	nf	nf
	722	93	nf	nf	nf	nf	nf	nf	nf	nf	nf	nf

Depth Range (fm)	Strata	Area (sq. mi.)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
31-50	330	2089	0	0	0	0	0	0	0	0	0	0
	331	456	0	0	0	0	0	nf	0	0	0	0
	338	1898	1053	326	206	499	142	53	0	0	245	0
	340	1716	7	0	1	0	0	0	0	0	0	0
	351	2520	0	604	0	0	0	0	0	0	0	0
	352	2580	713	25	66	523	119	0	0	0	0	0
51-100	353	1282	72	0	13	167	41	32	0	0	0	0
	329	1721	0	2	0	120	43	0	0	0	0	1110
	332	1047	165	447	1401	4401	44	5957	57	9	0	0
	337	948	1480	256	16023	35548	1662	0	433	0	2103	88
	339	585	0	0	0	0	0	0	0	0	0	0
	354	474	0	59	3215	302	18	0	0	0	141	0
101-150	333	147	2358	1065	68	9	213	317	1362	389	57	2432
	336	121	4823	1010	9	64	136	659	423	150	60	360
	355	103	479	380	166	56	164	66	0	0	96	59
151-200	334	96	283	11277	0	0	26	33	179	39	0	3
	335	58	2	295	35	0	180	57	19	177	1	5
	356	61	6	25	14	0	29	16	104	159	0	0
201-300	717	166	nf	nf	nf	nf	nf	nf	220	40	0	0
	719	76	nf	nf	nf	nf	nf	nf	38	28	0	0
	721	76	nf	nf	nf	nf	nf	nf	0	5	0	0
301-400	718	134	nf	nf	nf	nf	nf	nf	0	0	0	0
	720	105	nf	nf	nf	nf	nf	nf	0	0	0	0
	722	93	nf	nf	nf	nf	nf	nf	0	0	0	0

nf - strata not fished

Table 6. Mean number of haddock per tow at age from Canadian research vessel surveys in NAFO Divisions 3NO.

Age	1979	1980	1981	1982	1984	1985	1986	1987
0	0.01	0	0		0.02			0
1	0.41	0	0.34	12.21	0.12	0.06	0.04	0.77
2	0.03	0		18.16	6.35	0.08	0	0.04
3	0.01	0		0	18.4	1.36	0.16	0.57
4	0.06	0.03		0	14.97	3.63	4.31	2.56
5	0.12	0.18		0.01	0.16	1.77	4.61	3.27
6	0.04	0.03		0.02	0	0.2	0.1	0.84
7		0.01		0.04	0.01	0.02	0.01	0.11
8		0.01		0.02	0.02	0.02	0	0
9				0.06	0.05	0	0	0
10					0.02	0	0	0
11					0	0.01	0	0
12					0.02			
13					0.01			
14					0			
15					0.01			
Total	0.68	0.26	0.34	30.57	40.17	7.16	9.25	8.18
1 std dev	0.44	0.07	0.47	33.58	10.39	15.95	32.09	5.31
No. Sets	172	140	60	136	117	178	203	191
# aged	87	125	31	292	313	236	199	397
SHIP	ATC	ATC	ATC	ATC	AN	WT 29	WT	WT
Trip #	289-291	303-304	319	327-328	27	AN 43	47	58-59
MONTHS	Apr-Jun	Apr-May	May	Mar-Apr	Apr-May	Apr	Apr-May	Apr-May

Age	1988	1989	1990	1991	1992	1993	1994
0	0.01	0					
1	0.01	0	0.69	0.11	0	0	0.01
2	0.45	0.08	0.11	1.11	0.02	0	0
3	0.22	0.18	0.32	0.08	0.34	0.2	0.01
4	0.31	0.03	0.4	0.1	0.04	0.55	0.21
5	4.92	0.1	0.19	0.19	0.06	0.01	0.61
6	5.55	0.17	0.47	0.09	0.05	0.06	0.08
7	1.2	0.11	0.54	0.02	0.01	0.08	0.13
8	0.17	0.04	0.19			0.03	0
9	0.01	0.01	0.04				0
10	0.01						
11							
12							
13							
14							
15							
Total	12.87	0.72	2.95	1.79	0.52	0.94	1.04
1 std dev	9.54	0.21	3.39	1.22	0.5	3.54	0.47
No. Sets	161	195	171	209	185	166	157
# aged	280	223	256	168	174	92	100
SHIP	WT	WT	WT	WT	WT	WT	WT
Trip #	70	82	94-95	105-106	119-122	136-138	152-154
MONTHS	Apr-May	Apr-May	Apr-May	Apr-May	Apr-Jun	Apr-May	Apr-May

Table 7. Historical catches of haddock from NAFO Subdivision 3Ps.

Year	Canadian total	France total	Other ^a	Foreign total	Total	TAC ^b
1953	5849				5849	
1954	26,490		689	689	27,179	
1955	39,948		17849	17,849	57,797	
1956	25,177		4763	4,763	29,940	
1957	4,271		1808	1,808	6,079	
1958	368		591	591	959	
1959	1,699	28	1023	1,051	2,750	
1960	1948	144	1992	2,084	4,084	
1961	1,031	238	1488	1,727	2,757	
1962	702	35	744	779	1,481	
1963	578	158	1120	1,278	1,856	
1964	904	221	971	1,192	2,096	
1965	370	190	878	1,058	1,428	
1966	547	451	1001	1,452	1,999	
1967	1,257	373	732	1,105	2,362	
1968	1,066	159	1541	1,700	2,766	
1969	1,986	939	573	1,512	3,498	
1970	2,175	1158	1000	2,158	4,333	
1971	922	58	497	555	1,477	
1972	428	52	421	473	901	
1973	366	16	268	284	650	
1974	203	28	157	185	388	
1975	146	1		1	147	
1976	219	26		26	245	
1977	768	25		25	793	
1978	600	3		3	603	
1979	274	27		27	301	
1980	245	202		202	447	
1981	235	210		210	445	
1982	200	109		109	309	
1983	146	328		328	474	
1984	906	1839		1,839	2,745	
1985	2,226	5272		5,272	7,498	
1986	1,600	3782	31	3,813	5,413	
1987	673	2014		2,014	2,687	150
1988	1,761	626		626	2,387	2,200
1989	2,507	413		413	2,920	3,200
1990	1,508	70		70	1,578	3,200
1991	512	60		60	512	3,200
1992 ^c	453			0	453	3,200
1993 ^c	142			0	142	500
1994 ^c	21			0	0	500
1995						100

^a Predominantly Spain

^b Precautionary

^c Provisional

Table 8. Haddock biomass and abundance estimates from stratified random Research vessel surveys in NAFO Subdivision 3Ps.

Year	Abundance	1 std	Biomass	1 std
1972	2442	851	2886	1215
1973	1759	1015	683	177
1974	659	146	866	179
1975	478	174	666	179
1976	691	237	937	344
1977	1551	852	1996	1364
1978	214	162	118	50
1979	554	749	770	1583
1980	359	127	829	330
1981	342	200	472	263
1982	14602	6774	1570	438
1983	6684	3489	2345	1465
1984	7659	4484	6442	3024
1985	30328	12486	32349	13433
1986	18471	62074	18309	43595
1987	5724	3270	10092	6465
1988	3634	1404	5241	861
1989	7269	6717	5752	4374
1990	1181	415	3157	1595
1991	1419	2093	588	1618
1992	744	734	1045	3087
1993	387	132	793	181
1994	2565	15113	3070	16286
1995	847	4221	1450	6485

Table 9. Mean number of haddock at age from Canadian research vessel surveys in NAFO Subdivision 3Ps.

Age	1979	1980	1981	1982	1983	1984	1985	1986
1	0.00	0.00	0.04	10.38	0.51	0.17	0.01	0.06
2	0.10	0.00	0.04	0.45	3.86	0.25	0.16	0.01
3	0.03	0.00	0.02	0.27	0.37	4.78	0.61	3.77
4	0.08	0.04	0.06	0.16	0.11	1.41	21.56	5.32
5	0.25	0.13	0.07	0.05	0.11	0.34	2.94	4.09
6	0.19	0.02	0.02	0.01	0.08	0.08	0.38	0.69
7	0.02	0.04	0.00		0.01	0.03	0.06	0.04
8	0.01	0.00	0.00		0.01		0.03	0.01
9	0.01	0.01	0.00				0.04	0.05
10		0.00	0.00				0.00	0.01
11		0.00	0.02				0.00	0.01
12		0.01					0.00	0.01
13							0.00	0.01
14								
15								
total	0.73	0.28	0.28	11.41	5.07	7.06	25.81	14.08
1 std	1.63	0.10	0.16	5.30	2.65	4.13	10.63	47.32
no. sets	81	81	71	92	171	95	112	145
no ages.	131	36	40	233	322	184	291	312
Trip no.	atc 287	atc 302	atc 316	atc 330	an 9	an 26	wt 26	wt 45
dates	feb-mar	mar-apr	mar	may-june	apr-may	apr	mar	mar
wt/tow	1.01	0.64	0.38	1.23	1.79	5.94	27.53	13.95
1std	2.08	0.26	0.21	0.35	1.12	3.25	11.44	33.23

Age	1987	1988	1989	1990	1991	1992	1993	1994
1	0.13	0.61	2.47	0.09	0.03	0.01	0.00	0.02
2	0.06	0.18	1.64	0.07	0.72	0.14	0.01	0.00
3	0.05	0.04	0.21	0.10	0.16	0.12	0.13	0.00
4	0.18	0.07	0.04	0.05	0.04	0.02	0.02	0.44
5	0.99	0.44	0.04	0.08	0.03	0.09	0.01	1.20
6	2.71	0.94	0.19	0.31	0.03	0.09	0.02	0.09
7	0.17	0.47	0.14	0.23	0.01	0.03	0.02	0.04
8	0.04	0.01	0.51	0.04		0.03		0.03
9	0.01	0.00	0.01			0.03		0.01
10	0.02	0.00						
11	0.00	0.00						
12	0.00	0.01						
13	0.00							
14								
15								
total	4.37	2.77	5.56	0.98	1.08	0.55	0.29	1.85
1 std	2.50	1.07	5.08	0.34	1.59	0.53	0.11	10.88
no. sets	135	152	157	109	164	147	138	172
no ages.	299	396	263	151	108	119	49	182
trip no.	wt 55-56	wt 68	wt 81	wt 91	wt 103	wt 118	wt 133	wt 150-151
dates	feb-mar	jan-feb	feb	feb	feb	feb	apr	apr
wt/tow	7.71	3.99	4.37	2.61	0.45	0.8	0.6	2.1
1std	4.94	0.66	3.32	1.32	1.23	2.36	0.14	11.15

Table 10. Biomass (t) estimates of haddock by stratum from stratified random Canadian Research Vessel Surveys in NAFO Subdivision 3Ps.

Depth range (fm)	Strata	Area sq. mi.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
0 - 30	314	924	0	nf	0	nf	7	0	0	nf	0	0	7	63
	320	1320	nf	0	nf	nf	0	nf	nf	nf	0	0	105	94
31 - 50	308	112	nf	0	0	0	0	0	0	0	0	19	0	0
	312	272	72	nf	0	0	0	0	0	0	nf	0	0	5
	315	827	0	0	0	nf	0	0	nf	0	0	0	0	31
	321	1189	0	0	nf	nf	0	nf	0	nf	8	0	0	0
	325	944	nf	nf	nf	nf	0	nf	0	0	0	0	0	0
	326	166	nf	nf	nf	nf	nf	nf	0	0	0	0	0	0
51 - 100	307	395	323	0	152	111	0	30	0	19	74	0	342	22
	311	317	117	0	85	22	393	221	0	1	0	1	0	20
	317	193	155	3	89	13	92	204	nf	20	0	87	333	192
	319	984	17	12	34	141	84	1358	nf	0	0	0	293	633
	322	1567	nf	nf	nf	nf	3	nf	0	0	0	0	0	0
	323	696	5	nf	nf	nf	0	0	0	nf	0	0	0	0
101 - 150	324	494	nf	nf	nf	nf	0	nf	nf	0	0	nf	0	0
	306	419	nf	nf	21	0	86	0	0	136	0	142	28	67
	309	296	292	195	16	10	0	0	54	10	0	7	0	15
	310	170	804	79	195	215	nf	2	42	14	0	0	213	7
	313	165	742	64	160	79	202	103	22	40	133	149	152	929
	316	189	140	340	169	45	35	74	nf	80	106	31	nf	156
151 - 200	318	123	371	10	0	9	0	3	nf	14	105	nf	69	51
	705	195	nf	nf	15	0	37	0	0	6	0	0	0	0
	706	476	nf	nf	36	nf	nf	0	nf	87	373	0	0	0
	707	93	nf	nf	nf	0	0	0	nf	307	0	nf	nf	0
	715	132	nf	nf	nf	20	0	0	0	37	29	12	26	60
	716	539	nf	nf	nf	nf	nf	0	0	0	0	25	0	0
201 - 300	708	117	nf	nf	nf	0	nf	0	nf	0	0	nf	nf	0
	711	961	nf	nf	nf	nf	nf	nf	nf	nf	0	0	0	0
	712	973	nf	nf	nf	nf	nf	nf	nf	0	0	0	0	0
	713	950	nf	nf	nf	0	nf	nf	nf	nf	0	0	0	0
	714	1195	nf	nf	nf	nf	nf	nf	nf	nf	0	0	0	0
Depth range (fm)	Strata	Area sq. mi.	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
0 - 30	314	924	0	0	0	0	0	0	0	0	0	0	0	0
	320	1320	111	0	0	0	0	0	0	0	0	0	0	0
31 - 50	308	112	32	0	0	0	0	0	0	0	0	0	0	0
	312	272	1327	0	0	0	0	0	0	0	0	0	0	0
	315	827	1	0	0	0	1	0	0	0	0	0	0	0
	321	1189	0	0	0	0	0	0	0	8	0	0	0	0
	325	944	0	0	0	0	0	0	0	0	0	0	0	0
	326	166	0	nf	0	0	0	0	0	0	0	0	0	0
51 - 100	307	395	185	12	390	1408	331	30	0	2	0	0	0	0
	311	317	1178	9	4	0	90	0	8	0	0	0	0	0
	317	193	56	0	0	0	1	0	0	0	0	0	0	0
	319	984	3509	1108	129	164	332	74	nf	0	0	6	0	17
	322	1567	0	5	0	0	0	0	0	0	0	0	0	0
	323	696	0	3	0	1	0	0	0	0	0	0	0	0
101 - 150	324	494	0	0	0	0	1	0	0	0	0	0	0	0
	306	419	0	1195	105	841	307	15	102	0	0	1	11	0
	309	296	0	354	239	286	527	217	34	24	0	98	0	0
	310	170	0	4105	762	1180	116	43	0	0	0	79	117	0
	313	165	0	917	511	2598	19	508	7	26	5	0	8	28
	316	189	28	493	401	362	38	158	36	8	55	55	14	5
151 - 200	318	123	9	nf	7878	307	42	194	nf	129	23	128	6	1094
	705	195	0	3026	2357	139	176	0	193	3	0	161	174	158
	706	476	0	670	1237	907	652	665	603	102	409	74	13	43
	707	93	0	nf	1817	234	960	576	nf	240	502	149	5	73
	715	132	5	nf	37	25	67	69	60	3	42	43	25	0
	716	539	0	20392	1912	1243	1380	3070	2089	4	0	0	101	26
201 - 300	708	117	0	nf	37	211	176	83	nf	0	0	0	2597	7
	711	961	0	0	393	113	0	0	0	24	0	0	0	0
	712	973	nf	61	32	37	0	0	26	0	0	0	0	0
	713	950	nf	0	14	36	0	0	0	15	0	0	0	0
	714	1195	nf	nf	54	0	27	49	0	0	9	0	0	0

nf strata not fished

Table 11 . Catches (t) of Pollock in Subdivision 3Ps in the period 1967-1994.

Year	Canada MQ	Canada N	Canada Total	France Total	Other ^a	Foreign Total	Total	TAC
1967	31	163	194	20	403	423	617	
1968	29	80	109	6	330	336	445	
1969	2	62	64	8	115	123	187	
1970	22	61	83	1	378	379	462	
1971	1	76	77	1	198	199	276	
1972	76	78	154	4	153	157	311	
1973	6	115	121	-	145	145	266	
1974	40	94	134	15	69	84	218	
1975	5	95	100	23	-	23	123	
1976	4	65	69	35	33	68	137	
1977	611	224	835	4	-	4	839	
1978	253	177	430	2	-	2	432	
1979	520	198	718	59	-	59	777	
1980	83	487	570	94	-	94	664	
1981	48	198	246	42	-	42	288	
1982	96	338	434	336	-	336	770	
1983	157	772	929	181	-	181	1,110	
1984	608	711	1,319	497	-	497	1,816	
1985	704	624	1328	956	-	956	2,284	
1986	2106	3294	5400	2092	62	2154	7,554	
1987	88	2223	2311	2760	-	0	5,071	1500
1988	164	1588	1752	2514	-	0	4,266	5400
1989	1025	1133	2,158	1222	-	1,222	3,380	5400
1990	513	1068	1,581	438	-	438	2,019	5400
1991	51	1211	1,262	42	-	42	1,304	5400
1992 ^b	35	437	472	-	-	0	472	5400
1993 ^b	25	113	138	-	-	0	138	600
1994 ^b	34	59	93	-	-	0	93	500
1995								100

^a Catches by others mostly Spain

^b Provisional

Table 12. Mean number and weight of pollock per standard tow from Canadian research vessel surveys. in NAFO Subdivision 3Ps.

Year	1977	1978	1979	1980	1981	1982	1983	1984	1985
Ship Trips	ATC 261	ATC 273	ATC 287	ATC 302	ATC 316	ATC 302	AN 9	AN 26	WT 26
Month	April	Feb	Feb-Mar	Mar-April	Mar	May-June	April-May	April	Mar
Sets	102	105	81	81	71	82	171	95	112
Mean no.	0.25	0.18	0.5	0.59	1.23	0.49	0.34	0.42	2.49
1 Std	0.2	0.13	0.94	5.63	4.8	0.32	0.22	0.42	25.87
Mean wt.	0.59	0.28	1.03	1.29	3.3	1.05	0.87	0.68	3.16
1 Std	0.77	0.22	1.76	12.43	12.74	1.62	0.7	2.58	31.33
Abundance (000's)	146	156	361	761	1538	632	450	453	2931
Biomass (t)	342	247	782	1667	4112	1338	1149	738	3716
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994
Ship Trips	WT 45	WT 55-56	WT 68	WT 81	WT91	WT 103	WT 118	WT 135	T 150-151
Month	Mar	Feb-Mar	Jan-Feb	Feb	Feb	Feb	Feb	April	April
Sets	145	135	152	157	109	164	147	138	172
Mean no.	1.19	3.06	0.95	0.88	0.35	0.15	0.42	0.06	0.08
1 Std	0.69	6.59	0.41	0.33	0.2	0.08	4.4	0.14	0.04
Mean wt.	2.05	6.02	1.75	1.77	0.73	0.27	1.06	0.13	0.17
1 Std	0.88	11.27	1.6	0.57	0.42	0.19	11.76	0.3	0.19
Abundance (000's)	1556	4004	1241	1161	423	204	544	78	112
Biomass (t)	2692	7877	2302	2324	885	355	1388	167	244

Table 13. Average weight per tow by stratum and year for pollock in NAFO Subdivision 3PS 1977-1995

Strata	1977	1978	1979	1980	1981	1982	1983	1984	1985
306	0.00	1.65	3.59	39.50	121.33	9.37	4.50	0.00	92.00
307	0.23	0.29	1.02	1.59	2.17	1.13	5.83	10.00	0.00
308	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00
309	9.01	3.40	0.83	16.11	0.00	3.00	0.83	1.75	1.83
310	0.00	1.41	0.23	0.00	4.00	26.17	2.17	14.75	2.73
311	0.45	0.51	0.00	0.00	0.00	0.00	0.00	3.00	0.00
312	0.00	0.45	0.00	nf	0.00	0.00	6.17	0.00	0.00
313	1.71	0.54	0.54	0.00	0.25	1.50	0.00	0.85	8.25
314	0.00	0.00	nf	0.00	0.00	0.04	0.00	0.00	0.00
315	0.00	nf	0.00	0.00	0.00	0.00	1.13	0.00	0.00
316	0.00	0.15	3.78	0.00	5.85	nf	3.57	7.00	4.20
317	3.86	0.00	0.00	0.00	4.50	0.00	5.33	0.00	0.00
318	0.00	0.00	5.44	1.13	nf	40.00	5.00	0.00	nf
319	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00
320	nf	nf	nf	0.00	0.00	0.00	0.00	0.00	0.00
321	nf	0.00	nf	0.00	0.00	0.00	0.00	0.00	0.24
322	nf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
323	0.00	0.00	nf	0.00	0.00	0.00	0.00	0.00	0.20
324	nf	nf	0.00	0.00	nf	0.00	0.00	0.00	0.25
325	nf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
326	nf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	nf
705	0.00	0.00	28.35	0.00	2.00	1.00	0.00	0.55	4.60
706	0.40	0.00	0.00	0.00	0.00	0.20	0.00	0.00	3.95
707	0.00	1.36	0.00	0.00	nf	nf	0.00	0.00	nf
708	nf	nf	0.00	0.00	nf	nf	0.00	0.00	nf
709	nf	nf	nf	0.00	nf	nf	0.00	0.00	nf
710	nf	nf	nf	nf	nf	nf	0.00	0.00	0.00
711	nf	nf	nf	nf	0.00	0.00	0.00	nf	1.51
712	nf	nf	0.00	0.00	0.00	0.00	0.00	nf	1.07
713	nf	nf	nf	0.00	0.00	0.00	0.00	nf	0.38
714	nf	0.00	nf	0.00	0.00	0.00	0.00	nf	nf
715	1.13	0.24	9.31	0.91	0.00	3.40	0.00	0.00	nf
716	0.53	1.26	0.00	0.00	0.00	3.50	0.00	0.33	2.90
avg. fish wt.	2.36	1.56	2.06	2.19	2.68	2.14	2.56	1.62	1.27

nf - strata not fished

Table 13 continued . Average weight per tow by stratum and year for pollock in NAFO Subdivision 3PS 1977-1995

Strata	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
306	16.33	165.00	0.47	0.00	2.18	0.00	0.26	0.26	0.31	1.20
307	3.67	0.30	6.80	1.67	2.78	0.00	0.00	2.77	0.14	0.00
308	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00
309	5.00	14.60	8.60	3.25	2.53	0.43	0.00	0.00	0.55	0.00
310	3.00	10.50	23.40	0.50	0.69	0.00	0.40	0.55	3.70	0.00
311	0.00	0.60	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
312	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
313	12.00	79.26	42.25	11.50	2.05	0.00	97.53	0.00	4.15	2.42
314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
315	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00
316	5.75	3.50	3.67	3.60	1.02	1.10	5.90	0.62	0.00	0.00
317	0.00	0.00	0.00	0.00	1.75	0.00	0.00	0.00	0.00	0.00
318	9.00	98.75	1.95	15.25	nf	6.95	0.87	3.92	1.05	513.60
319	4.56	0.00	0.00	0.00	nf	0.19	0.00	0.00	0.00	11.88
320	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
321	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
322	0.00	0.05	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00
323	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
324	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
325	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
326	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
705	4.25	1.50	9.50	4.00	8.78	0.68	0.00	0.00	0.00	13.88
706	2.75	0.50	4.75	3.25	1.59	0.61	0.00	0.59	0.00	3.33
707	37.50	5.50	1.95	6.19	nf	3.24	5.38	0.40	1.33	6.48
708	10.50	0.63	6.00	8.00	nf	0.00	0.00	0.00	7.00	0.00
709	nf	nf	nf	2.50	nf	0.00	nf	0.00	0.00	0.00
710	0.00	nf	0.00	nf	nf	0.00	nf	0.00	0.00	nf
711	0.61	0.36	0.51	2.07	1.32	0.27	0.00	0.00	0.00	0.39
712	0.00	0.13	0.71	1.75	2.20	0.15	0.00	0.00	0.48	5.64
713	1.40	0.00	2.56	1.19	0.36	0.66	0.00	0.00	0.00	0.00
714	1.80	0.00	0.80	7.33	1.00	0.19	0.29	0.00	0.00	0.00
715	26.00	1.00	6.50	34.25	0.00	0.10	1.17	0.00	0.00	0.00
716	4.75	3.17	4.68	4.13	1.04	0.25	0.00	0.00	0.00	0.00
avg. fish wt.	1.72	1.97	1.84	2.01	2.09	1.80	2.52	2.17	2.13	0.94

nf - strata not fished

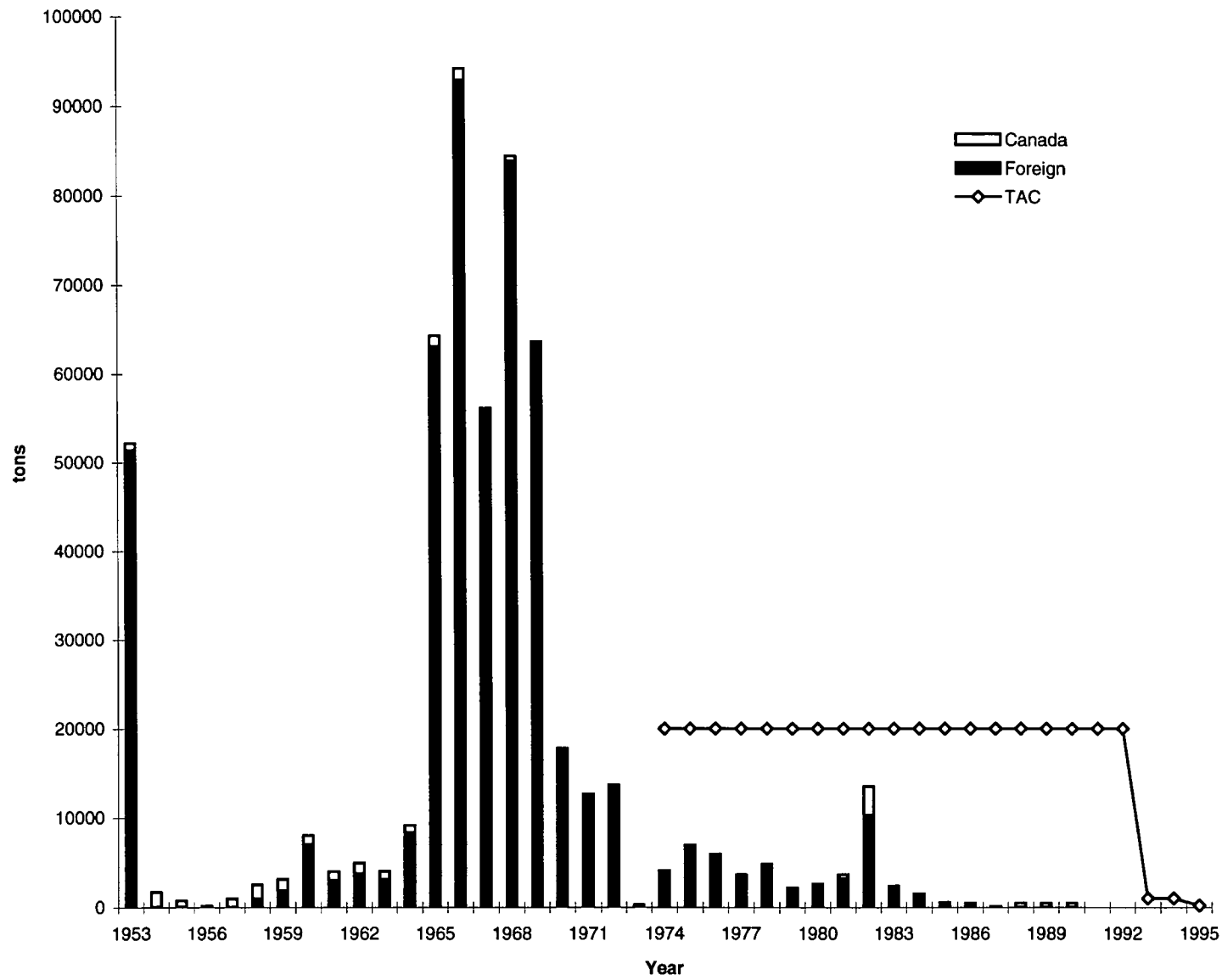


Figure 1. 2GH Nominal Cod Catches and TACs.

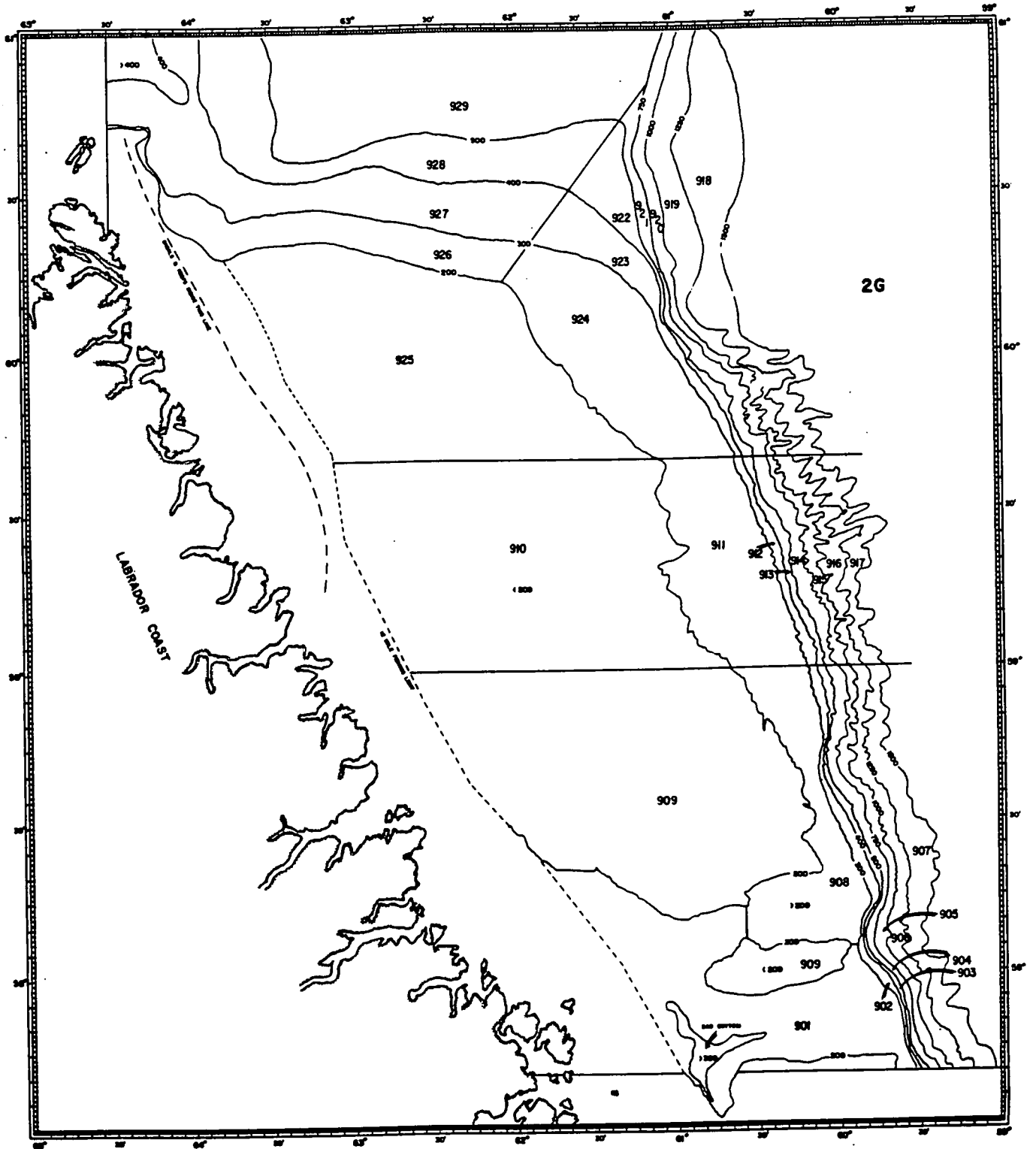


Figure 2. NAFO Division 2G Stratification scheme.

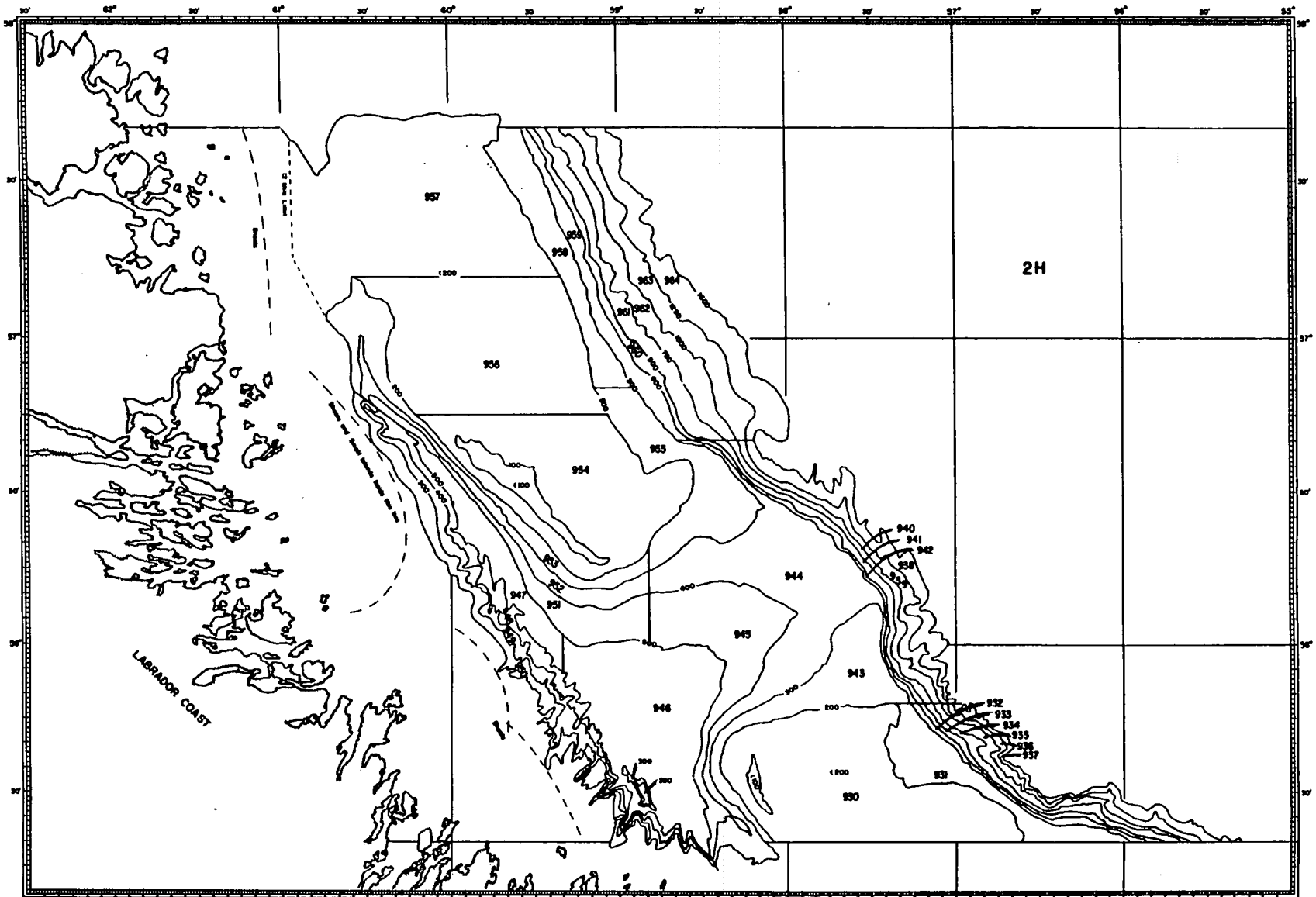


Figure 3. NAFO Division 2H Stratification scheme.

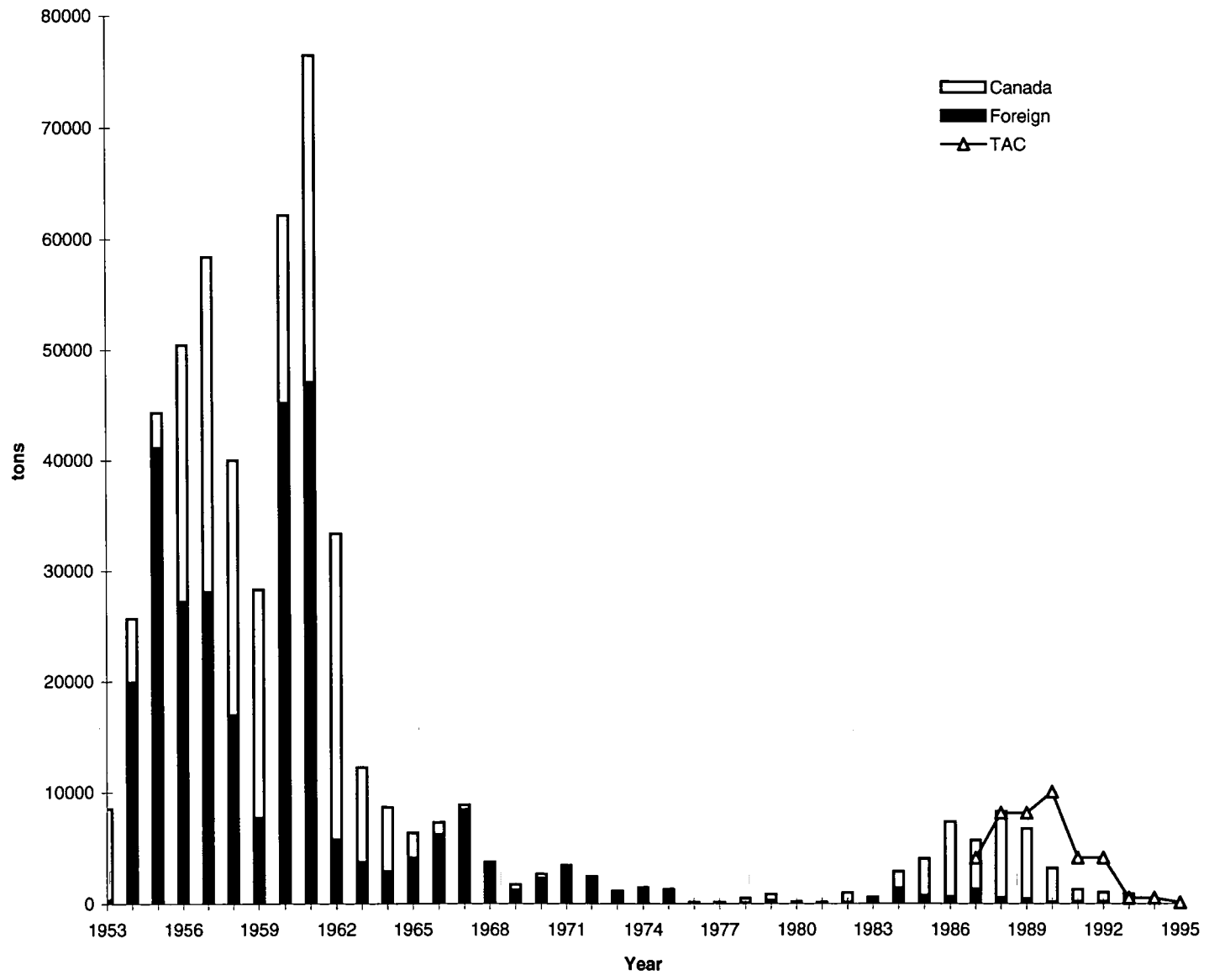


Figure 4. Nominal haddock catches and TACs in NAFO Divisions 3LNO.

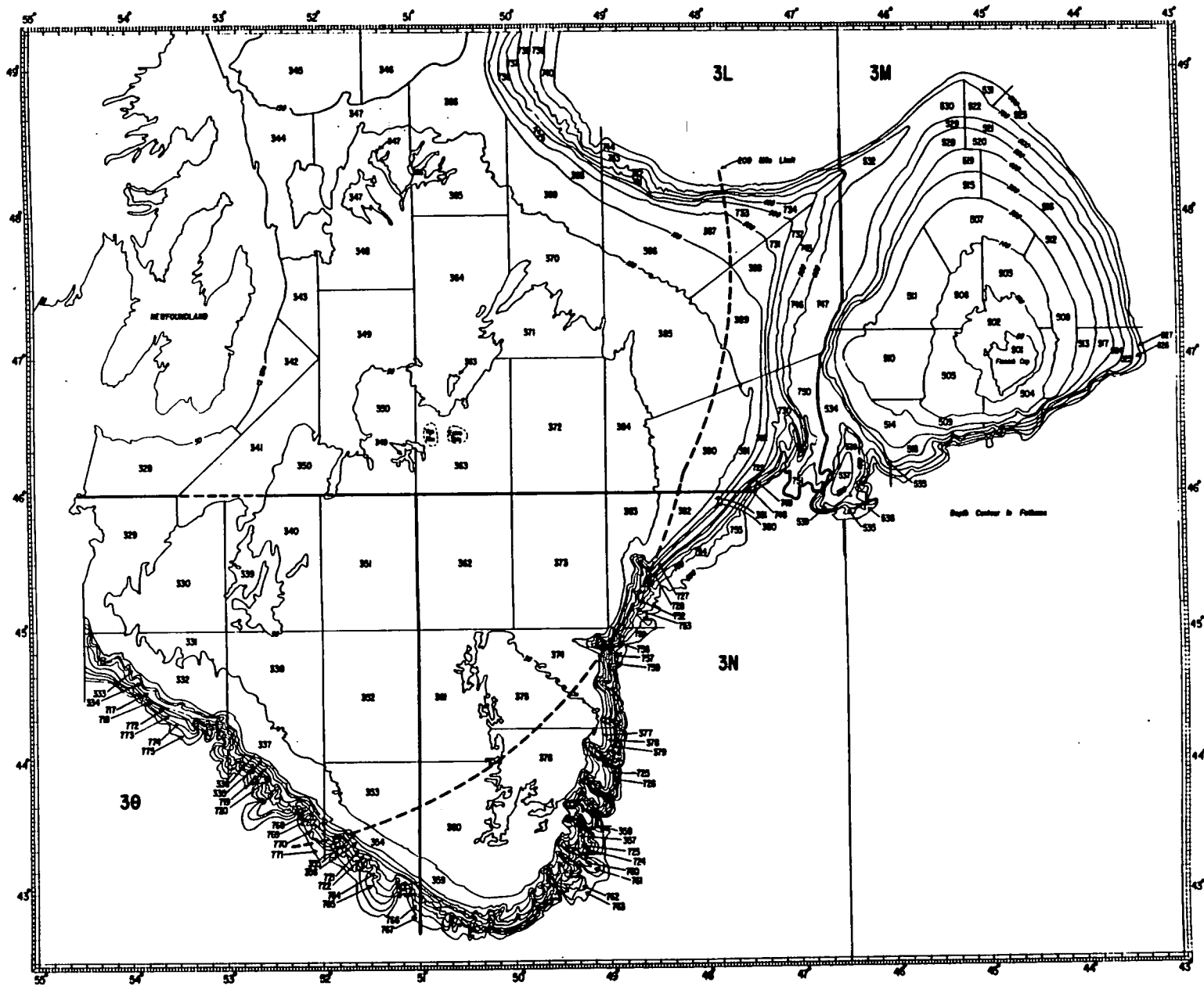


Figure 5. NAFO Divisions 3LMNO Stratification scheme.

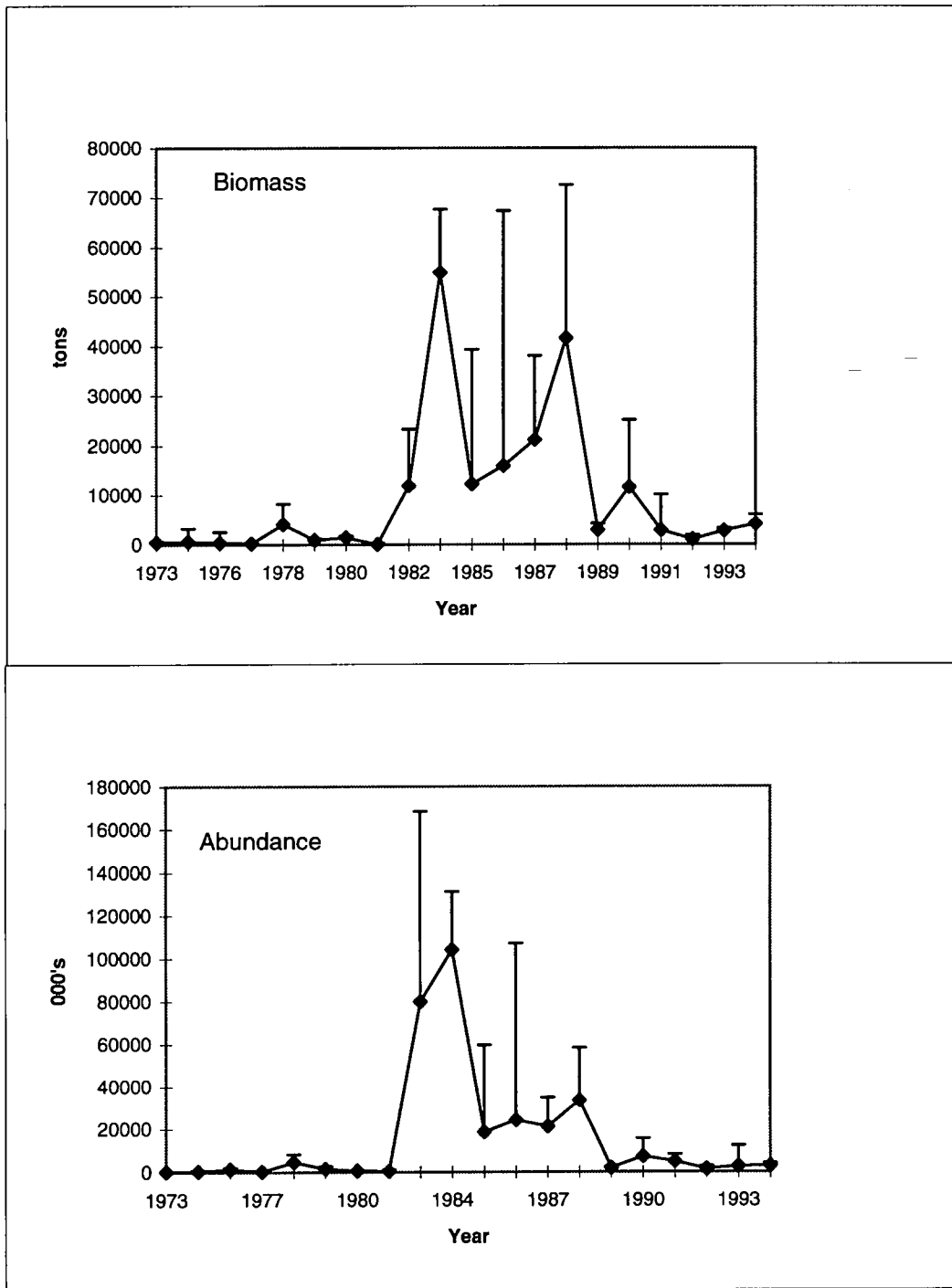


Figure 6. Haddock biomass and abundance from Canadian Research Vessel Surveys (Spring) in NAFO Divisions 3NO (showing 1 SD).

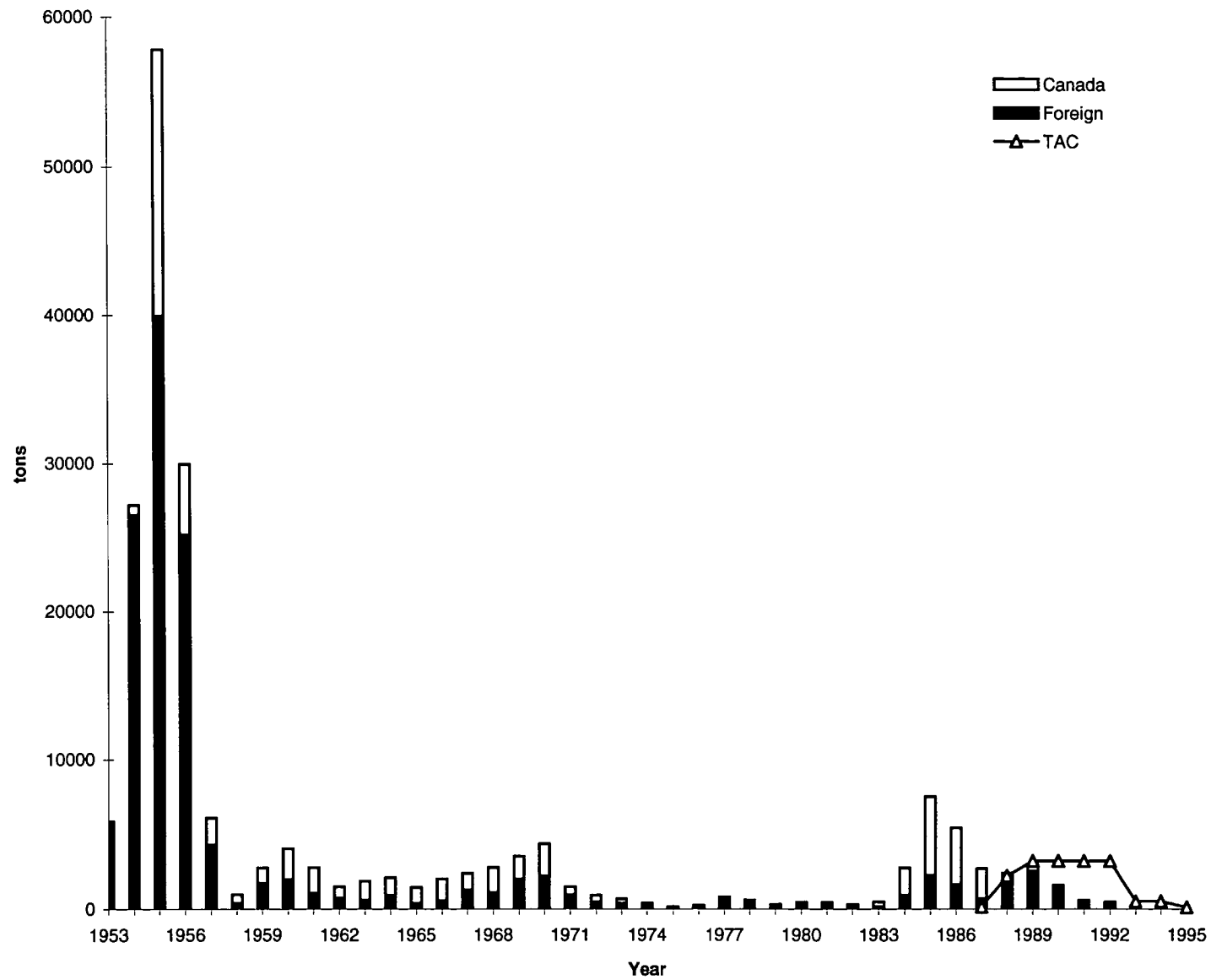


Figure 7. Nominal haddock catches and TACs in NAFO Subdivision 3Ps.

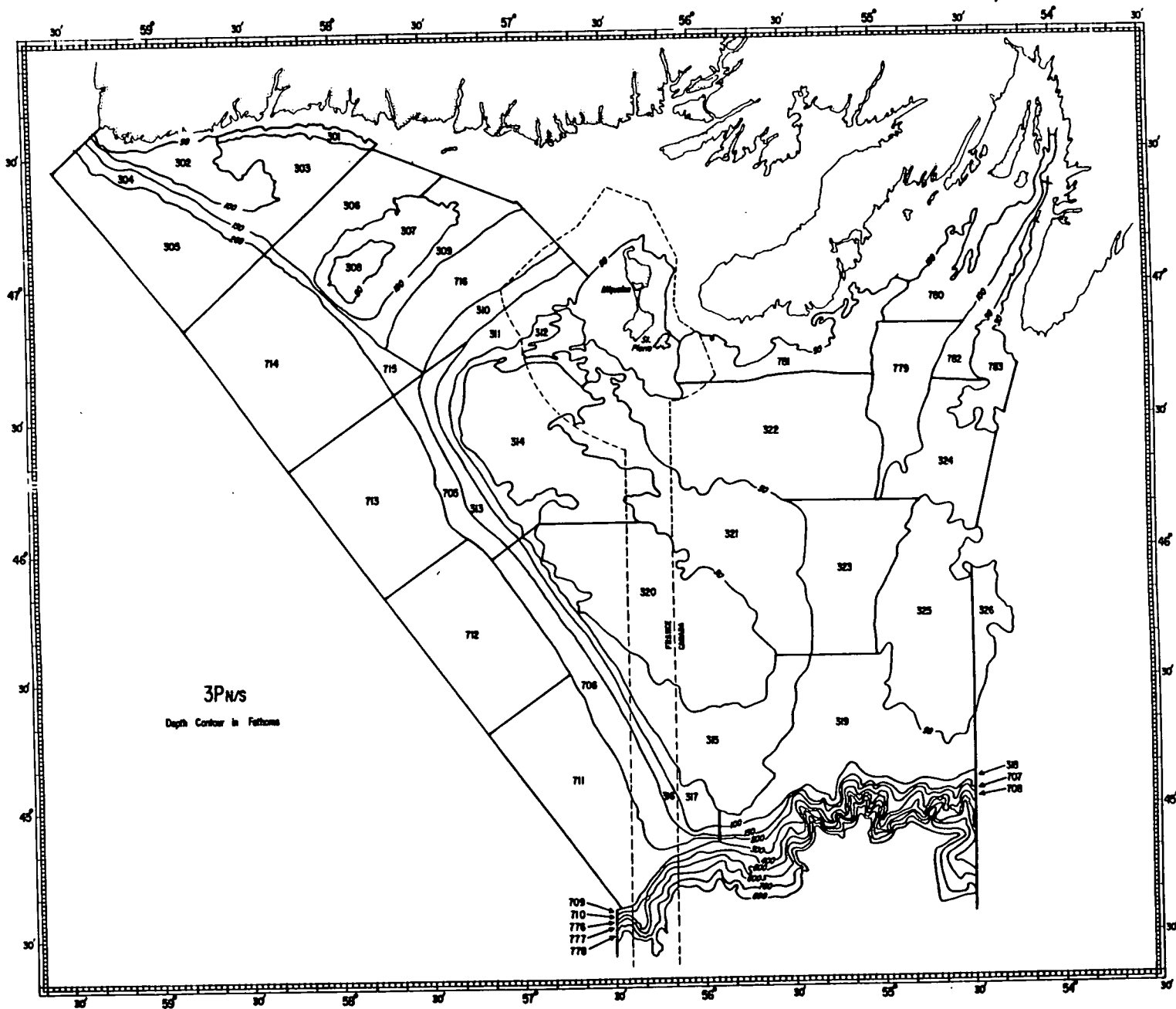


Figure 8. NAFO Division 3P Stratification scheme.

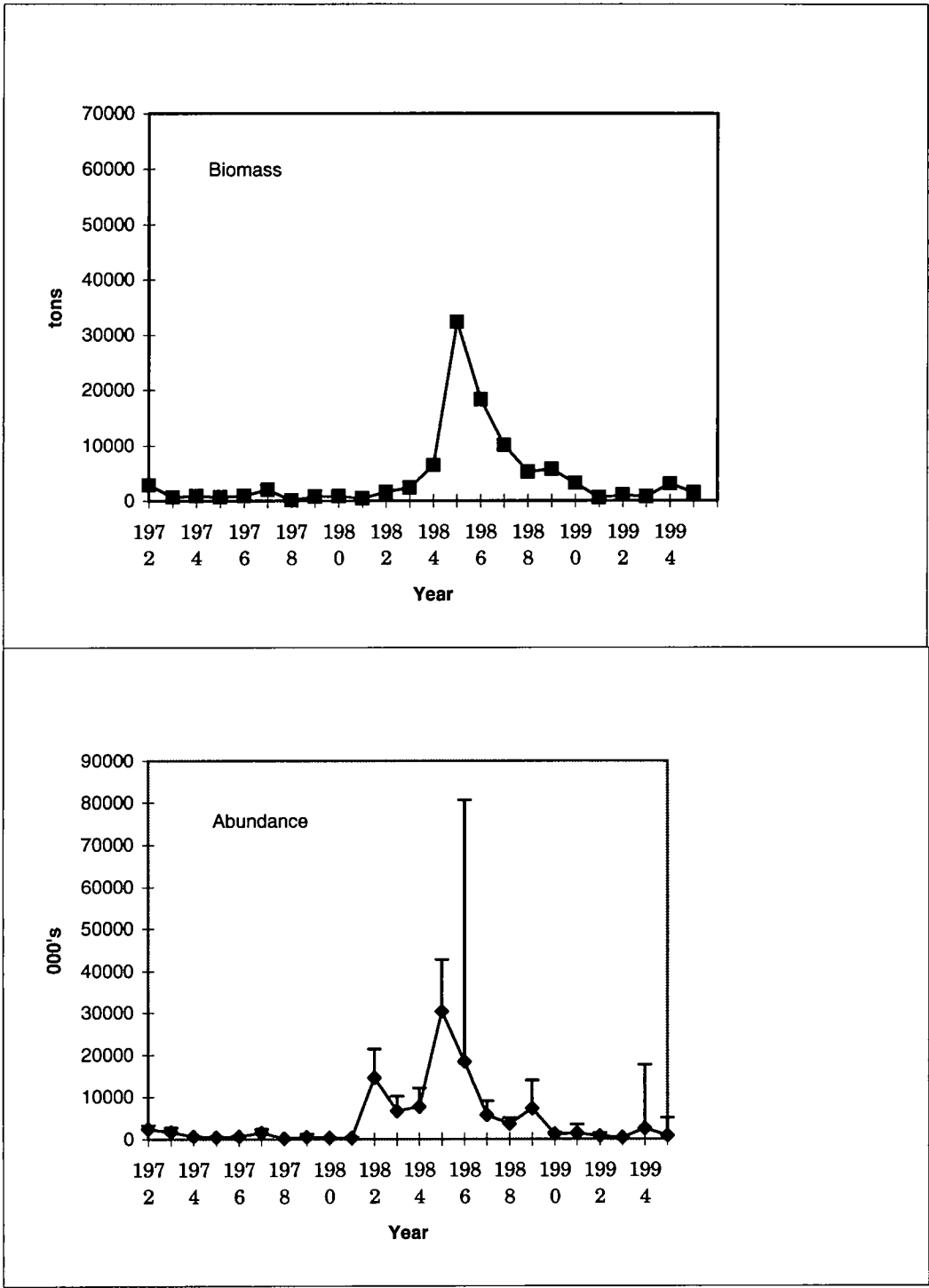


Figure 9. Biomass and Abundance estimates of haddock from Canadian Research Vessel Surveys in NAFO Subdivision 3Ps (showing 1 sd).

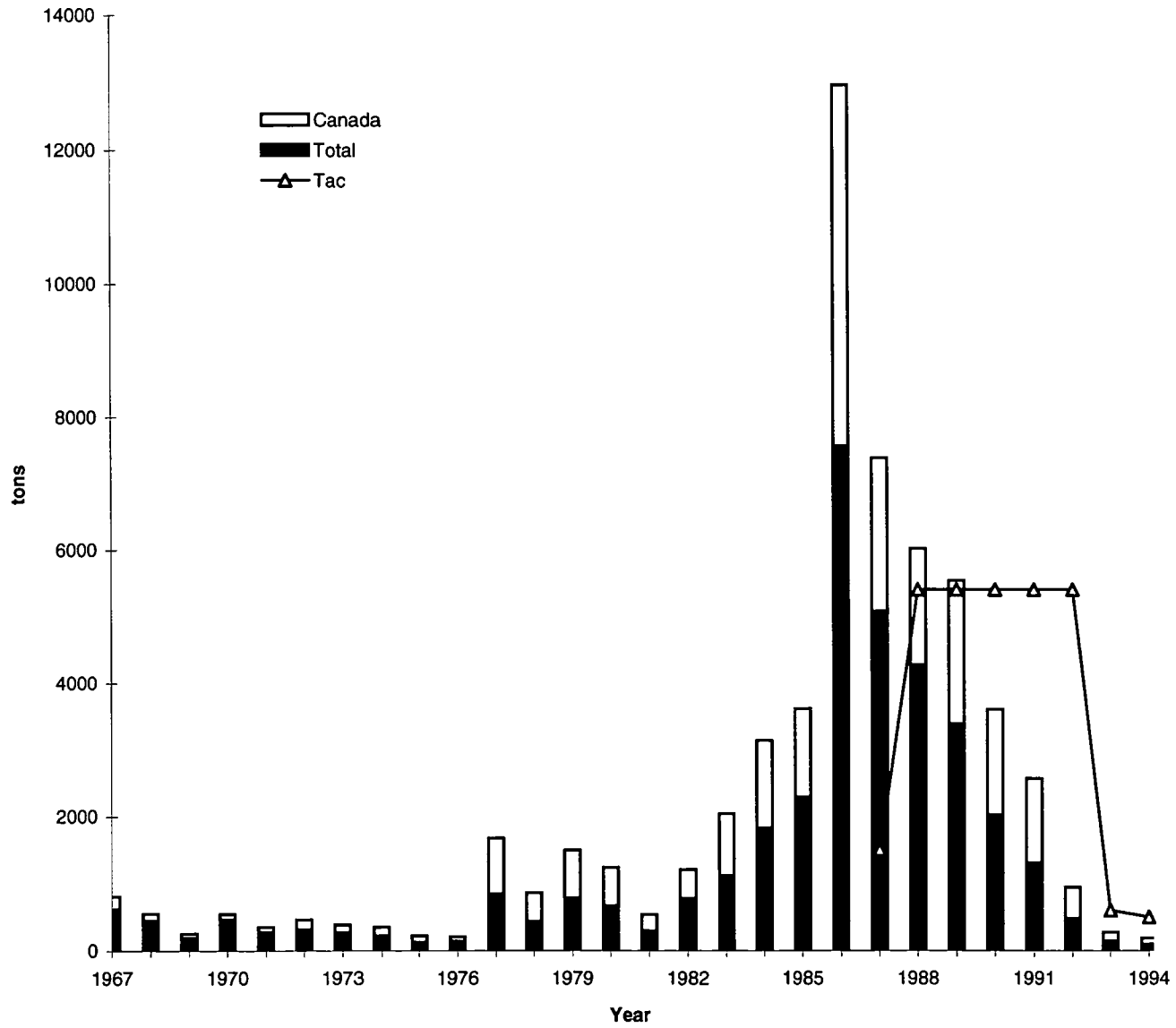


Figure 10. Nominal catches of pollock in NAFO Subdivision 3Ps

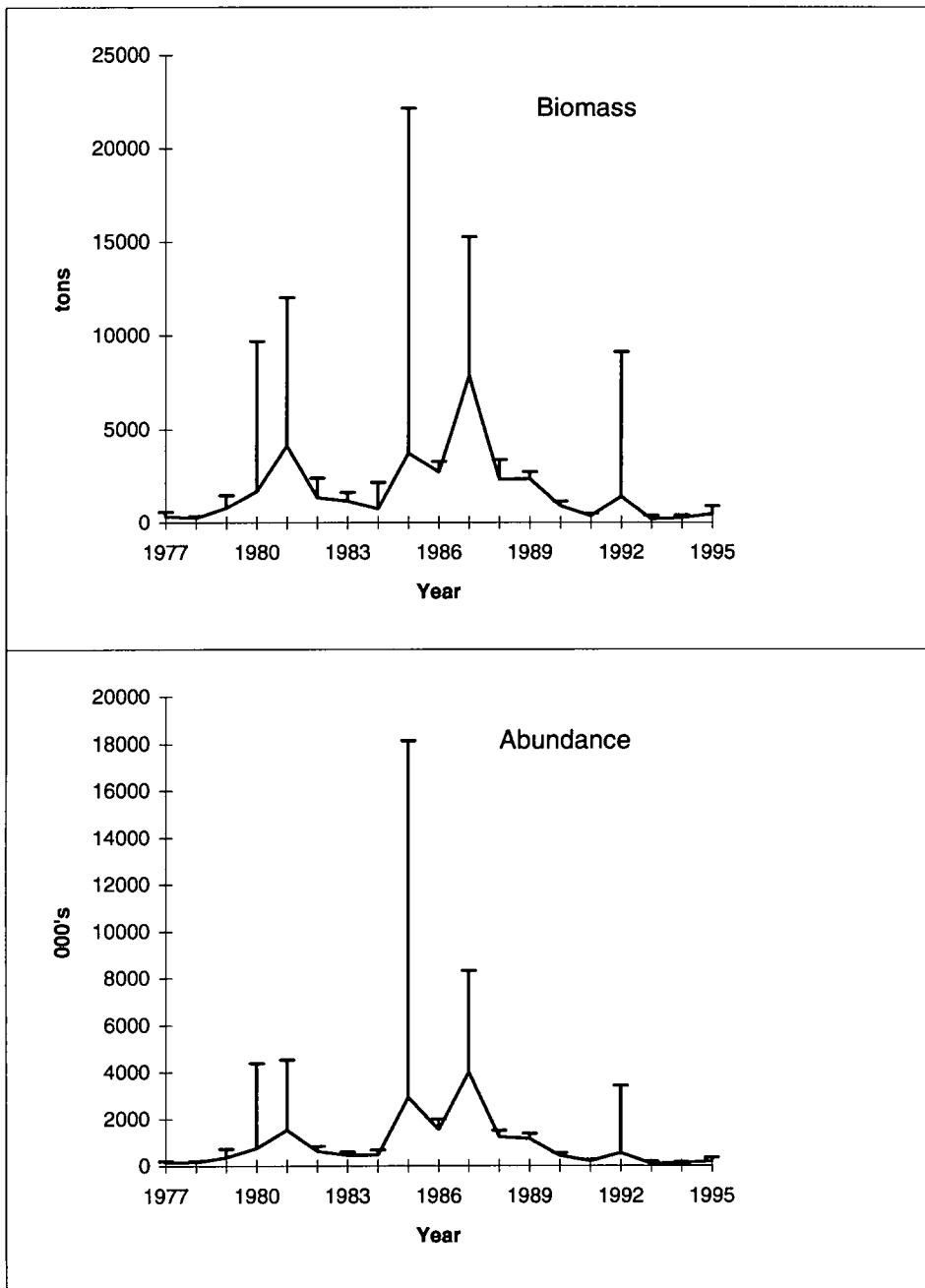


Figure 11. Pollock Biomass and Abundance from Canadian Research Vessel Surveys in NAFO Subdivision 3Ps (showing 1 SD).