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Analysis of the Cod Stock in NAFO Divisions 2GH

by

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Abstract

Nominal catches from this stock ranged from 95,000t in 1966 to 300t in 1973. A TAC of 20,000t was first introduced in 1974 and has remained unchanged since that time. The 1979, 1980 and 1981 year-classes were dominant in the 1986 commercial catch. Data available in recent years do not form an adequate basis upon which to perform an assessment of the stock or to update management advice.

Résumé

Les prises nominales pour ce stock ont varié de 95 000 t en 1966 à 300 t en 1973. Un TPA de 20 000 t a été introduit pour la première fois en 1974 et est resté inchangé depuis. Les classes d'âge de 1979, 1980 et 1981 dominaient dans les captures commerciales de 1986. Les données disponibles pour les dernières années ne constituent pas une base adéquate pour l'évaluation du stock ou pour la mise à jour des conseils relatifs à la gestion.

Introduction

Total annual catches from this stock have ranged from 94,000t in 1966 to 300t in 1973 (Fig. 1). Catches in recent years have ranged between 5 and 10% of the TAC and are as follows (000t):

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
TAC	20	20	20	20	20	20	20	20	20	20
Nominal catch	5	2	3	4	14	2	2	1 ^a	1 ^a	

^apreliminary.

The commercial fishery

An estimate of commercial catch for 1986 by country and month as obtained from the Department of Fisheries and Oceans, Canada and NAFO circular letters is presented in Table 1. Of the total catch only 5 t were reported from Div. 2G. Sampling data obtained by the Foreign Observer Program are listed in Table 2. The 1986 catch at age and average lengths and weights at age estimated using this sampling are shown in Table 3. A sum of products check indicated a discrepancy of about 5%. Catch at age of commercial catches since 1978 are shown in Table 4. Catch and effort data (Table 5) were obtained by Canadian observers on foreign vessels. Catch rates for 1986 in tons per hour were available only from the Federal Republic of Germany and from a low amount of directed catch (93 t).

Research vessel surveys

A research vessel survey using the stratified-random sampling design (Fig. 2) was attempted in September 1986. Because of mechanical problems coverage was limited mainly to a small number of strata in Div. 2H (Table 6). Estimates of mean number per tow at age and length are shown in Table 7. Approximately 60% of the sampled population was from the length range 40-52 cm which corresponded closely with numbers at ages 4+5.

Discussion

Up to the present attempts to assess the status of this stock have not used a sequential population analysis because the catch at age was poorly estimated and there were no appropriate indices (commercial catch rates and/or survey estimates) available for calibration.

Table 1. Nominal catches (t) of cod in NAFO Divisions 2GH during 1986.

Month	Can(N)		FRG	Poland	USSR	DenF	Total
	OT	GN					
J							
F							
M							
A							
M							
J							
J							
A	5 ^a	18					23
S		30			1	111	142
O		1				164	165
N			115				115
D	292						292
NK				33			33
Total	297	49	115	33	1	275	770

^a Total reported from 2G - all countries.

Table 2. Sampling of the commercial catch of cod in NAFO Div. 2GH during 1986.

Gear	Quarter	Country	No. Aged	Month	No. Meas.	Landings(t)	
						Country/Month	Total
LL	3	Den(F)	287 ^a	Sept.	2791	111	111
LL	4	Den(F)	"	Oct.	3920	164	164
OT	4	FRG	"	Nov.	503	115	407
							<u>682</u>
		Other					83
Total			287		7214		765

^a Combined A/L key from Qtr. 3 (153) and qtr. 4 (134).

Table 3. Estimate of catch numbers (000's), average weight (kg) and average length at age (cm) from the commercial fishery in NAFO Divisions 2GH in 1986.

AGE	AVERAGE		CATCH		
	WEIGHT	LENGTH	MEAN	STD, ERR,	C, V,
3	0.485	38.453	4	1.58	0.43
4	0.634	41.748	29	5.87	0.20
5	0.979	48.047	181	16.06	0.09
6	1.413	54.026	107	17.58	0.16
7	1.642	56.869	157	17.86	0.11
8	1.846	59.067	46	10.95	0.24
9	2.427	64.632	5	2.53	0.48
10	2.723	67.113	2	1.03	0.56
11	3.328	71.580	4	0.99	0.26
12	3.794	74.840	2	0.56	0.24
13	3.079	69.481	1	0.71	0.53
14	3.426	72.318		0.25	0.80
15	5.588	85.000		0.04	1.24

Table 4. Catch at age for cod in Divisions 2GH from 1979-86.

Age	1978	1979	1980	1981	1982	1983	1984	1985	1986
2			17						
3	7		24	1	62	3	3	1	4
4	123	72	38	5	103	55	50	13	29
5	2254	207	249	23	131	47	262	49	181
6	1257	615	332	360	227	29	103	161	107
7	201	79	516	423	1207	18	13	44	157
8	108	7	21	906	973	158	11	11	46
9	117	1	2	74	2058	108	65	5	5
10	108	1		7	128	196	60	34	2
11	52	1		4	5	7	98	14	4
12	21	1		2	4	1	9	34	2
13				1	2			2	1
14				1	2				

Table 5. Catch rates (t/hr) in the directed cod fishery in Division 2H obtained by Canadian observers on foreign vessels. Number in brackets represent the amount of directed catch involved.

Country	Gear	1979	1980	1981	1982	1983	1984	1985	1986
Poland	OT-7	0.58 (1067)	0.15 (31)	5.03 (463)	0.78 (35)	0.39 (38)			
Portugal	OT-6/7	0.51 (106)	1.09 (100)		1.33 (224)		0.69 (41)		
FRG	OT-7		1.72 (415)		2.97 (3238)		0.68 (50)		1.5(93)
GDR	OT-5					0.24 (51)		0.96 (25)	
GDR	OT-7		1.55 (362)	1.39 (212)	1.23 (245)				
Den-Fa	LL-4			0.32 (1448)	0.30 (1864)	0.35 (880)	0.26 (333)	0.27 (72)	
Nor ^a	LL-4					0.34 (413)	0.27 (181)	0.25 (220)	

^aCPUE = c/1000 hooks.

Table 6. Cod abundance (No. $\times 10^{-3}$) and biomass (t) from a research vessel cruise in Div. 2H in September, 1986.

Depth Zone	Strata	Area	Abundance	Biomass
≤200	930	1028	6312	5476
	954	971	-	-
	956	1051	-	-
	957	1371	-	-
	Total	4421		
201-300	931	276	2538	4030
	943	354	1262	1541
	950	261	-	-
	953	291	-	-
	955	389	-	-
	958	294	-	-
	Total	1865		
301-400	932	55	-	-
	944	860	1153	1612
	949	206	-	-
	952	177	-	-
	959	178	-	-
	Total	1476		
401-500	933	50	-	-
	942	55	4	5
	945	461	-	-
	948	246	-	-
	951	234	-	-
	960	107	-	-
	Total	1153		
501-750	934	78	0	0
	941	89	0	0
	946	721	-	-
	947	227	-	-
	961	211	-	-
	Total	1326		
	Total	10241	11269	12663
	Upper		19351	24110
	Lower		3188	1216

Table 7. Mean number of cod per tow at age and at length from a research vessel survey during September, 1986 in NAFO Div. 2H.

Age	Mean Number per tow	Length (cm)	Mean Number per tow
1	0.00	22	0.08
2	0.55	25	0.23
3	3.49	28	0.74
4	12.17	31	1.03
5	19.74	34	2.78
6	7.19	37	3.59
7	7.71	40	6.88
8	3.04	43	8.49
9	0.20	46	6.99
10	0.09	49	6.70
11	0.37	52	5.25
12	0.10	55	4.43
13	0.00	58	4.11
14	0.10	61	1.48
15	0.00	64	0.79
16	0.05	67	0.61
		70	0.17
		73	0.30
		76	0.05
		79	0.05
		112	0.05
Total	<u>54.79</u>		<u>54.79</u>
Upper	94.08		94.08
Lower	15.50		15.50

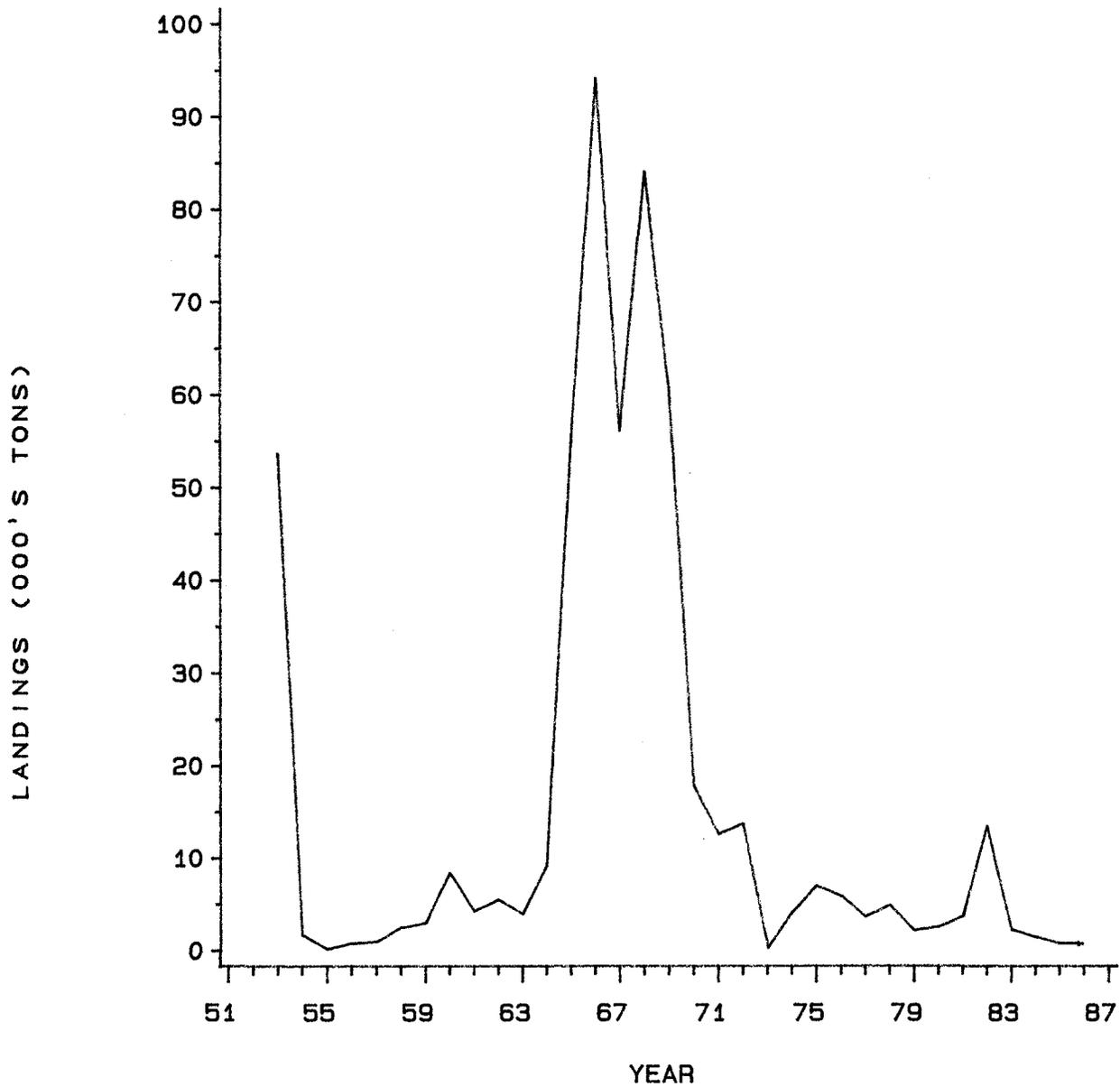


FIG. 1. LANDINGS OF COD IN NAFO DIVISIONS 26H IN THE YEARS 1953-86.

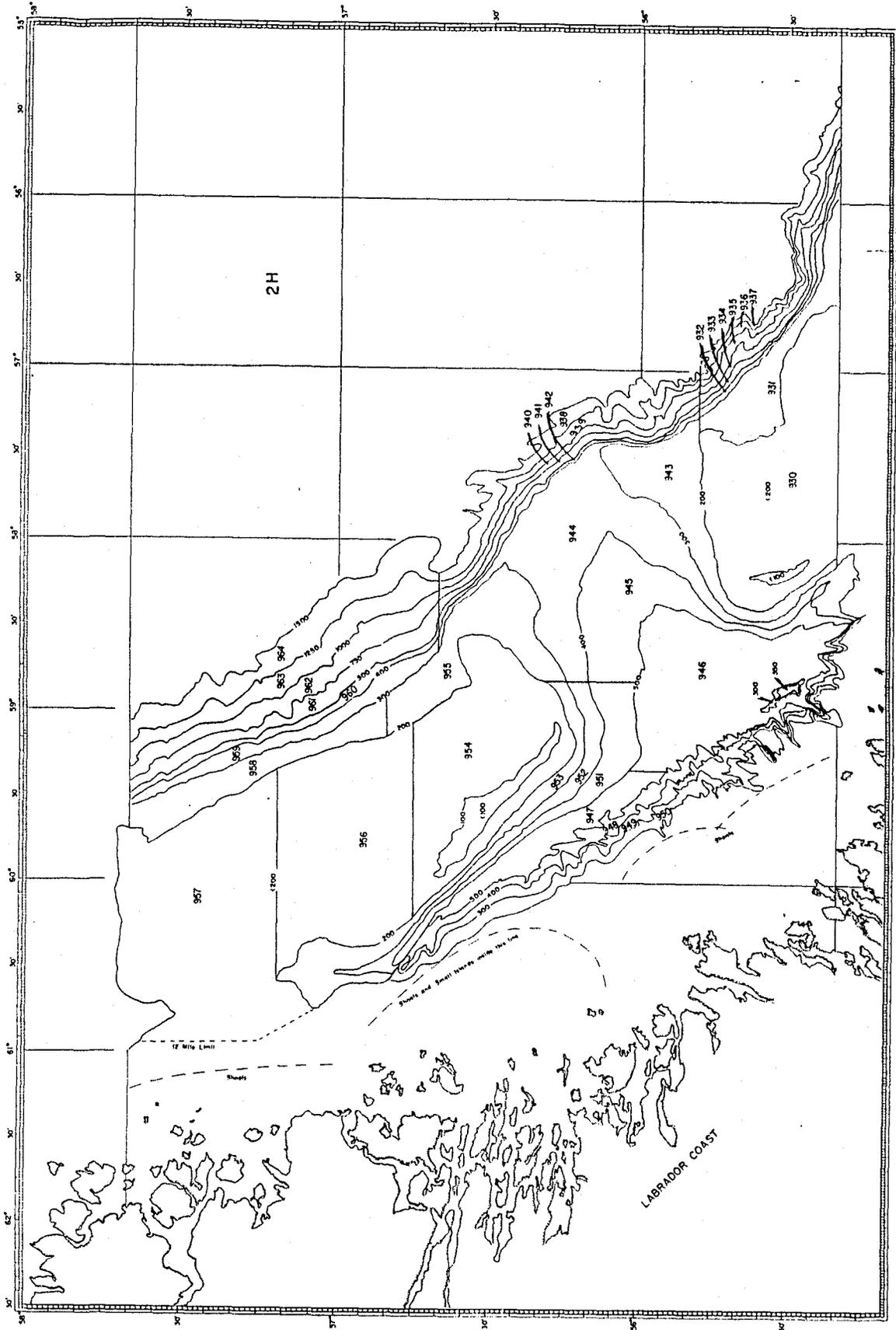


Fig. 2. Stratification scheme for NAFO Division 2H.