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Contribution to the assessment of the cod stock in Subdivision 3Ps

by

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1. Nominal catches.

Total cod catches by France in Subdivision 3 Ps were of 10871 tons in 1989 (Table 1, Fig. 1). The decline started in 1987 (25819 tons) still continued. The offshore trawlers contribute to the most important part of landings (97 %) while inshore catches (handlines and longliners) are low (338 tons, 3 % of the total) (Table 2, 3 ; Fig. 2).

On the same period 1987-1989, Canadians landings are nearly stable and represent 72 % of the total for the last year (Table 1 to 3, Fig. 2 to 4).

French cod catches are principally reported from the offshore fisheries while Canadian ones are from the inshore fisheries (Table 1 to 3, Fig. 3, 4). The offshore trawlers activity is mainly conducted in autumn and winter, while inshore fishing occurs in summer (Table 4).

Metropolitans trawlers, whose catches were respectively of 9985 tons and 7373 tons in 1987 and 1988, drastically reduced their activity in Subdivision 3Ps in 1989 (892 tons) (Table 4).

Catch rates for OTB5 and OTB6 on the period 1978-1989 are presented in table 5 and 6.

2. Biological data.

Cod sampling from french commercial landings in Subdivision 3 Ps for 1989 is described in table 7.

Biological parameters calculated for 1989 (mean weight and mean length at age) are given in table 8.

No estimation for sexual maturity was conducted in 1989, so data used for assessment (Table 9) are the same than the ones presented by Bertrand et al. (1988).

Age composition of the french cod catches in Subdivision 3 Ps for 1989 (Table 10, 11) reveals that the french fishery is almost based on the exploitation of two year classes (age 4 and age 5) and in part of the age 6. Catches of cod 4 years old have increased since 1986 (Table 11).

3. Survey data.

In 1989 and 1990 surveys were carried out as usually in February-March. Biomass estimates calculated from the stratified random surveys since 1978 and the corresponding abundance indices are respectively presented table 12 and 13.

Evolution of the average number of cod per set and age on the period 1978-1990 (Table 14) shows very strong recruitments (age 2) for the years 1987, 1988 and 1989 while the 1990's is one of the lower. Since 1986 the number of adults decrease strongly. Length composition of cod catches confirm these statements. The decrease in abundance of individuals with length inferior to 24 cm and superior to 45 cm from 1988 to 1990 is shown in figure 5.

Cod biomass and abundance indices are decreasing since 1986, and the first parameter reach a level similar to the one observed during the first years of the studied period (Fig. 6).

4. References.

Bertrand J., A. Maucorps, 1988. Contribution to the assessment of the cod stock in Subdivision 3 Ps. *NAFO SCR.Doc.* 88/74, 15 p.

Mabeau S., J.C. Poulard, J.C. Mahé, 1986. Research survey abundance indices for the cod stock in NAFO Subdivision 3 Ps, their reliability and compatibility with results of a cohort analysis. *Int. Counc. Expl. of the Sea. Dem. Fish. Com.* G:38, 9 p. + fig.

Poulard J.C., 1986. Contribution to the assessment of the cod stock in Subdivision 3 Ps. *NAFO SCR Doc.* 86/34, 7 p.

Year	Canada (N)		Can (M)	France		TOTAL					
	Inshore	Offshore		(1)	(2)	Spain	Portugal	Others	Canada	France	Total
1959	2726	32718	4784	3078	4952	7794	3647	471	40228	8030	60170
1960	1780	40059	5095	3634	2460	17223	262	2123	46934	6094	72636
1961	2167	32506	3883	4140	11490	21015	4985	3434	38556	15630	83620
1962	1176	29888	1474	2241	4138	10289	1873	1560	32538	6379	52639
1963	1099	30447	331	1757	324	10826	209	6828	31877	2081	51821
1964	2161	23897	370	2097	2777	15216	169	9880	26428	4874	56567
1965	2459	25902	1203	2570	1781	13404		4535	29564	4351	51854
1966	5473	23785	583	3207	4607	23678	519	4355	29841	7814	66207
1967	3861	26331	1259	2244	3204	20851	980	4044	31451	5448	62774
1968	6536	22938	585	1880	1126	26868	8	18613	30059	3006	78554
1969	4269	20009	849	2477	15	28141	57	7982	25127	2492	63799
1970	4650	23410	2166	1970	35	35750	143	8734	30226	2005	76858
1971	8657	26651	731	1651	2730	19169	81	2778	36039	4381	62448
1972	3323	19276	252	1436		18550	109	1267	22851	1436	44213
1973	3107	21349	181	1165		19952	1180	5707	24637	1165	52641
1974	3770	15999	657	948	5366	14937	1246	3789	20426	6314	46712
1975	741	14332	122	775	3549	12234	1350	2270	15195	4324	35373
1976	2013	20978	317	904	1501	9236	177	2007	23308	2405	37133
1977	3333	23755	2171	1252	1734				29259	2986	32245
1978	2082	19560	700	1974	2860			45	22342	4834	27221
1979	2381	23413	863	4289	2060				26657	6349	33006
1980	2809	29427	715	1936	2681				32951	4617	37568
1981	2696	26068	2321	4101	3706				31085	7807	38892
1982	2639	21351	2948	4780	2184				26938	6964	33902
1983	2100	23915	2580	5618	4238				28595	9856	38451
1984	895	22865	1969	7550	3671				25729	11221	36950
1985	4529	24854	3476	10064	8444				32859	18508	51367
1986	5155	24884	1963	14042	11939			7	32002	25981	57990
1987	4087	26781	2517	15854	9965				33385	25819	59204
1988 ^a	3426 ^b	19740 ^b	2308	10293	7373				25474 ^a	17666	43140
1989 ^a	2774 ^b	22886 ^b	2366	9979	892				28026 ^a	10871	38897

Can (N): Canada, Newfoundland

Can (M): Canada, Maritimes

France (1) 1959-1985 : SPM ; since 1986 : inshore SPM + OTB 5

France (2) 1959-1985 : Metropolitans ; since 1986 : OTB 6-7

a provisional data

b provisional estimation inshore/offshore catches

Table 1 - Cod catches (metric tons) in NAFO Subdivision 3 Ps by country for the period 1959-1989.

	France				Can (M)					Can (N)					
	Insh.	OTB (5)	OTB (6-7)	TOT.	OT	GN	LL	HL	TOT.	OT	GN	LL	HL	FPN	TOT.
1978	360	1614	2860	4834	693		7		700	2082	2374	11811	3130	2245	21642
1979	495	3794	2060	6349	695		168		863	2381	3955	14292	3123	2030	25781
1980	214	1722	2681	4617	703		12		715	2809	5493	19312	2545	2077	32236
1981	333	3768	3706	7807	826		1495		2321	2696	4998	18980	1142	948	28764
1982	1009	3771	2184	6964	993		1955		2948	2639	6281	11542	1597	1929	23988
1983	843	4775	4238	9856	1479		1101		2580	2100	6144	11588	2540	3643	26015
1984	777	6773	3671	11221	1776		193		1969	895	7275	9376	2942	3271	23759
1985	642	9422	8444	18508	3461		15		3476	4529	7086	10261	1832	5674	29382
1986	389	13653	11939	25981	1418		545		1963	5155	8570	10951	1078	4059	29813
1987	550	15304	9965	25819	1667		850		2517	4087	9128	10857	1628	4901	30601
1988	286	10005	7373	17664	1657		651		2308	3426	6494	9327	1522	2398	23167
1989	338	9641	892	10871	1232	40	1091	3	2366	2774	5885	9264	1664	6074	25661

Table 2 - Cod catches (metric tons) by main gear type in NAFO Subdivision 3 Ps from 1978 to 1989.

	France			Can (M)				Can (N)				
	Insh.	OTB (5)	OTB (6-7)	OT	GN	LL	HL	OT	GN	LL	HL	FPN
1978	7.4	33.4	59.2	99.0		1.0		9.6	11.0	54.6	14.5	10.4
1979	7.8	59.8	32.4	80.5		19.5		9.2	15.3	55.4	12.1	7.9
1980	4.6	37.3	58.1	98.3		1.7		8.7	17.0	59.9	7.9	6.4
1981	4.3	48.3	47.5	35.6		64.4		9.4	17.4	66.0	4.0	3.3
1982	14.5	54.1	31.4	33.7		66.3		11.0	26.2	48.1	6.7	8.0
1983	8.6	48.4	43.0	57.3		42.7		3.8	30.6	39.5	12.4	13.8
1984	6.9	60.4	32.7	90.2		9.8		3.8	30.6	39.5	12.4	13.8
1985	3.5	50.9	45.6	99.6		15		15.4	24.1	34.9	6.2	19.3
1986	1.5	52.5	46.0	72.2		27.8		17.3	28.7	36.7	3.6	13.6
1987	2.1	59.3	38.6	66.2		33.8		13.4	29.8	35.5	5.3	16.0
1988	1.6	56.6	41.7	71.8		28.2		14.8	28.0	40.3	6.6	10.3
1989	3.1	88.7	8.2	52.1	1.7	46.1	0.1	10.8	22.9	36.1	6.5	23.7

Table 3 - Cod catches (%) by main gear type in NAFO Subdivision 3 Ps from 1978 to 1989.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	T. I	T. II	T. III	T. IV	TOTAL
Inshore																	
1987	12	16	12	10	45	250	172	13	12	7	1	1	40	304	197	9	551
1988	4	2	8	12	31	91	82	37	10	10	0	0	14	134	128	10	287
1989	1	2	6	10	32	139	94	32	13	7	1	1	9	181	139	9	338
Offshore SPM (OTB 5)																	
1987	3887	275	1486	2395	1162	288	121	0	0	1476	2554	1660	5648	3845	121	5690	15304
1988	2545	520	200	502	511	103	4	0	41	1436	2382	1761	3265	1116	45	5579	10005
1989	1205	601	578	243	348	309	193	0	164	973	2936	2091	2384	900	357	6000	9641
Metropolitans (OTB 6-7)																	
1987	2949	4188	1598	0	0	0	0	0	0	358	775	97	8735			1230	9965
1988	2265	1145	843	321	148	0	0	0	0	573	768	1310	4253	469		2651	7373
1989	584	228	80	0	0	0	0	0	0	0	0	0	892	0	0	0	892

Table 4 - Monthly landings in cod (metric tons) by french fleets from 1987 to 1989.

Year	1978			1979			1980			1981			1982			1983		
Month	Cat. (t)	Eff. (h)	cpue (t/h)	Cat. (t)	Eff. (h)	cpue (t/h)	Cat. (t)	Eff. (h)	cpue (t/h)	Cat. (t)	Eff. (h)	cpue (t/h)	Cat. (t)	Eff. (h)	cpue (t/h)	Cat. (t)	Eff. (h)	cpue (t/h)
January				297	108	2.75	569	146	3.90	465	265	1.75	126	111	1.14	351	230	1.53
February	200	79	2.53				5	9	0.56	19	16	1.19						
March	190	38	5.00	220	100	2.20	2	14	0.14	17	46	0.37	7	36	0.19			
April	64	104	0.62	128	186	0.69				150	225	0.67	296	202	1.47	1127	1020	1.10
May	10	99	0.10	176	585	0.30	158	236	0.67	159	324	0.49	1234	1019	1.21	640	911	0.70
June							31	32	0.97				248	494	0.50	238	235	1.01
July										9	20	0.45	1	5	0.20	166	347	0.48
August																		
September							33	53	0.62				121	226	0.54	3	12	0.25
October	150	185	0.81	1062	730	1.45	215	341	0.63	13	20	0.65	444	921	0.48	397	413	0.96
November	850	444	1.91	1269	631	2.01	579	298	1.94	1274	928	1.37	795	1028	0.77	1473	863	1.71
December	150	169	0.89	632	419	1.51	129	130	0.99	675	569	1.19	406	478	0.85	370	402	0.92
Total	1614	1118	2.13	3784	2759	1.55	1721	1259	1.12	2781	2413	0.90	3678	4520	0.73	4765	4433	0.96

Year	1984			1985			1986			1987			1988			1989		
Month	Cat. (t)	Eff. (h)	cpue (t/h)	Cat. (t)	Eff. (h)	cpue (t/h)	Cat. (t)	Eff. (h)	cpue (t/h)	Cat. (t)	Eff. (h)	cpue (t/h)	Cat. (t)	Eff. (h)	cpue (t/h)	Cat. (t)	Eff. (h)	cpue (t/h)
January	735	251	3.13	980	324	3.02	1453	452	3.21	3886	599	6.49	2495	1169	2.13	1205	1257	0.96
February				904	327	2.76	715	198	3.61	271	185	1.46	507	1564	0.32	601	1561	0.39
March				1279	728	1.76	820	396	2.07	1428	926	1.54	174	797	0.22	578	1849	0.31
April																243	452	0.54
May	1235	626	1.97	1034	506	2.04	2451	760	3.23	2395	1332	1.80	502	643	0.78	348	459	0.76
June	42	87	0.48	639	926	0.69	590	1208	0.49	265	1119	0.24	103	884	0.12	309	1655	0.19
July	316	438	0.72	344	555	0.62	244	1030	0.24	122	780	0.16	4	68	0.06	193	130	1.48
August							4	50	0.08									
September				152	152	1.00	140	284	0.49				41	112	0.37	164	487	0.34
October	731	805	0.91	507	986	0.51	756	1599	0.47	1476	1597	0.92	1436	1533	0.94	973	2201	0.44
November	1502	842	1.78	1635	981	1.67	1885	781	2.41	2554	1591	1.61	2382	1810	1.32	2936	2014	1.46
December	642	287	2.24	430	269	1.60	2680	802	3.34	1659	1206	1.38	1758	1399	1.26	2092	1234	1.70
Total	5977	3969	1.55	9205	6642	1.55	13337	8622	1.76	15214	11223	1.62	9912	11145	0.72	9641	13298	0.71

Table 5 - Cod catches, effort and c.p.u.e for OTBS french stern trawlers (main species sought : cod) by month in NAFO Subdivision 3 Ps from 1978 to 1989.

Year	1982			1983			1984			1985		
Month	Cat. (t)	Eff. (d)	cpue t/d	Cat. (t)	Eff. (d)	cpue t/d	Cat. (t)	Eff. (d)	cpue t/d	Cat. (t)	Eff. (d)	cpue t/d
January	180	26	6.9	580	23	25.2	70	3	23.3	294	9	32.7
February				3	0.5	6.0	334	11	30.4	586	8	73.3
March	45	6	7.5	600	13	42.9	219	11	19.9	1138	51	22.3
April				132	3	44.0	221	6	36.8	565	32	17.7
May							139	9	15.4	1387	49	28.3
June							23	2	11.5	181	30	6.0
July												
August												
September										106	8	13.3
October	37	8	4.6	491	20	24.6	755	24	31.4	1282	62	20.7
November	607	57	10.7	2081	68	30.6	1647	43	38.3	2795	99	28.2
December	1315	63	20.9	351	11	31.9	263	7	37.6	111	17	6.5
Total	2184	159		4238	138		3671	115		8444	364	

Year	1986			1987			1988		
Month	Cat. (t)	Eff. (d)	cpue t/d	Cat. (t)	Eff. (d)	cpue t/d	Cat. (t)	Eff. (d)	cpue t/d
January				2541	86	29.5	2265	81	28.0
February	2262	103	21.9	3915	216	18.1	1145	102	11.2
March	1942	80	24.3	1259	84	15.0	843	79	10.7
April	2715	83	32.7	13	2	6.5	321	28	11.5
May	1810	118	15.3				148	10	14.8
June	26	21	1.2						
July									
August									
September									
October	663	75	8.8	293	32	9.2	573	12	47.8
November	1609	87	18.5	635	28	22.7	768	26	29.5
December	912	29	31.5	79	12	6.6	1309	31	42.2
Total	11939	596		8737	460		7372	369	

Table 6 - Cod catches, effort, c.p.u.e for OTB6-7 french stern trawlers (main species sought : cod) by month in NAFO Subdivision 3 Ps from 1982 to 1988.

Quarter	I	II	III	IV	Total
Offshore (OTBS)					
N° of samples	10	4	1	15	30
N° measured	2426	936	236	2479	6077
N° aged	403	133	37	384	957
Weight of catches (t)	2384	900	357	6001	9642
Ponderal sampling rate (o/oo)	1.3	1.2	0.7	0.5	0.8
Inshore (doris)					
N° of samples	0	2	1	0	3
N° measured	0	434	154	0	588
N° aged	0	0	30	0	30
Weight of catches (t)	9	180	140	9	338
Ponderal sampling rate (o/oo)	0	4.5	1.3	0	2.9

Table 7 - Cod sampling from french commercial landings (Subdivision 3 Ps) in 1989.

Age	Mean weight (kg)	Mean length (cm)	N° of measures
2	0.101	22.50	14
3	0.691	41.75	48
4	0.872	45.28	285
5	1.207	50.65	259
6	1.493	54.77	132
7	1.810	58.46	162
8	2.930	68.76	106
9	3.227	70.91	46
10	4.151	78.20	11
11	5.685	86.74	7
12	6.118	87.83	2
13	6.744	90.84	4
14	8.531	98.36	5
15	11.507	108.5	1
16	15.680	119.5	2
Total			1084

Table 8 - Mean weight and mean length at age of cod (Subdivision 3 Ps) in 1989 from commercials landings sampling.

	1959-1985	1986-1988
Age		
3	.010	.010
4	.070	.050
5	.390	.300
6	.810	.680
7	.980	.920
8	1.000	.990
9	1.000	1.000
10 et +	1.000	1.000

Table 9 - Mean evolution of sexual maturity at age (%) in cod Subdivision 3 Ps.

Quarter	I	II	III	IV	YEAR
AGE					
2	1558				1558
3	61823	46534		466529	574886
4	741760	234596		2225670	3202026
5	450787	254733		1780690	2486210
6	232180	206251		548950	987381
7	260121	161140		144063	565324
8	90717	29378		0	120095
9	27799	12604		32293	72696
10	7350	9797		17773	34920
11	5028	5821			10849
12	2064	1830			3894
13	4618	2648			7266
14+	6898				6898
Total (nb)	1892703	965332		5215968	8074003
Catches (tons)	2393	1081	496	6009	9979

Table 10 - Quaterly age composition of the french cod catches in Subdivision 3 Ps for 1989.

Year	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Age												
2			13								18	2
3	292	25	116	106	44	118	45	96	30	94	703	576
4	1115	956	186	362	1078	586	1470	2485	1807	7309	2229	3236
5	1466	2152	673	591	1141	2541	1431	4844	6075	4886	2363	2567
6	932	1196	1212	919	750	1427	1947	2206	5937	5424	2209	1037
7	332	392	414	1262	591	575	948	1525	2126	2650	2496	584
8	87	121	127	238	440	268	217	465	745	817	835	130
9	16	30	28	47	57	163	232	121	205	477	338	745
10	10	19	8	13	5	27	89	112	61	146	73	35
11	5	5	1	3	1	8	38	121	43	72	22	11
12	3	5	2	3	3	3	11	53	33	8	33	4
13+		2	2	2	1	1	3	12	31	41*	20	14
Total	4258	4903	2782	3548	4111	5717	6431	12040	17093	15346	11339	8270
Catches (tons)	4834	6349	4617	7807	6964	9856	11221	18508	25981	25819	17666	10871

Table 11 - Age composition (number in thousand) of the french cod catches in Subdivision 3 Ps from 1978 to 1989.

Depth (m)	Strata	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
< 55	314	17	0	-	1390	111	30	0	7	13	133	-	17	0
	320	108	814	-	3797	513	2803	3526	104	14	-	0	316	222
	Total	125	814	-	5187	624	2833	3526	111	27	133	0	333	222
56-90	308	371	9	150	88	299	151	111	65	100	29	6	25	0
	312	820	270	112	2304	454	636	1403	145	343	0	28	55	2
	315	771	850	0	1076	821	326	16918	8	1813	2058	2134	198	41
	321	183	4785	3746	2199	3746	1362	1026	3	543	-	649	0	0
	325	-	-	-	2101	-	1332	1466	81	259	0	453	0	0
	Total	2145	5914	4008	7768	5320	3807	20924	302	3058	2087	3270	278	43
91-180	307	3598	2714	4428	1876	9009	6269	5384	2976	23172	8089	565	6168	215
	311	87	3199	1136	5797	8202	3572	19599	1276	20627	1356	4815	675	267
	317	0	260	-	813	454	421	21353	1502	2562	1049	815	974	226
	319	997	5810	1303	4435	4078	11349	8101	2831	3179	5746	5434	5889	3067
	322	605	1945	3381	1793	2404	967	1122	2388	5944	2734	215	864	172
	323	91	572	858	822	54	794	803	512	2399	953	311	60	10
	324	-	-	-	0	-	815	964	594	288	99	171	90	44
	Total	5378	14500	11106	15536	24201	24187	57326	12079	58171	20026	12326	14720	4001
181-270	306	3080	2660	2162	12197	3716	11967	2296	804	23131	8294	4041	4690	663
	309	167	2743	804	2176	1122	3318	3852	1581	7434	1901	4827	7947	6726
	310	411	190	19	481	1683	739	229	4675	169	503	739	164	93
	313	113	331	1	1099	1279	840	170	1753	142	562	26	373	240
	316	91	121	39	282	544	36	332	38395	695	334	320	2324	4464
	318	42	25	-	593	34	5282	786	1828	28349	259	4558	941	2096
	Total	3904	6070	3025	16828	8378	22182	7665	49036	59920	11853	14511	16439	14282
271-365	705	321	1115	13	574	4550	984	1661	99	414	354	394	325	49
	706	11	0	293	952	4010	375	1141	333	3896	13845	1413	296	768
	707	-	1303	-	13	10980	652	49	2314	3338	134	102	118	193
	715	836	832	1564	827	4159	1261	3806	2282	2613	1908	1772	542	1759
	716	178	455	1169	554	2104	1934	2326	86	2775	5685	6264	439	1096
	Total	1346	3705	3039	2920	25803	5206	8983	5114	13036	21926	9945	1720	3865
366-545	708	-	-	-	85	373	44	8	593	849	6136	264	429	899
	711	-	-	-	0	-	296	-	-	-	-	-	0	1058
	712	-	-	-	0	-	300	-	-	-	-	-	0	2926
	713	-	-	-	108	-	-	-	-	-	-	-	0	2268
	714	-	-	-	354	-	0	-	-	-	-	-	0	9607
Total	-	-	-	547	373	640	8	593	849	6136	264	429	16758	
0-545	Total	12899	31002	21178	48787	64699	58856	98433	67235	135061	62164	40316	33918	39169

Table 12 - Estimated cod biomasses (in metric tons) in Subdivision 3 Ps from french stratified surveys, yearly conducted in late winter (February-March).

Depth (m)	Strata	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
< 55	314	33	0	(73)	267	22	133	0	33	33	67	(354)	33	0
	320	36	241	(256)	784	90	572	663	136	45	(785)	0	90	181
	Total	69	241	329	1051	112	705	663	169	78	852	354	123	181
56-90	308	189	12	35	35	161	46	157	50	134	31	38	65	0
	312	605	99	28	677	456	99	6837	155	298	0	75	56	5
	315	368	57	0	269	113	85	3597	28	321	868	265	28	28
	321	20	896	326	502	387	221	147	16	55	(628)	1222	0	0
	325	(108)	(152)	(138)	129	(567)	275	647	65	226	0	485	0	0
	Total	1290	1216	527	1612	1684	726	11385	314	1034	1527	2085	149	33
91-180	307	1948	1154	3084	640	4662	2958	2624	785	21238	4694	1136	8851	1144
	311	402	1628	1158	4357	3995	4147	15162	1954	18038	9503	16231	5973	1040
	317	0	119	(697)	724	4940	1696	16436	989	1182	8457	5410	7993	859
	319	1051	4583	1146	3262	3516	7666	5473	3909	2887	5695	3639	9413	13319
	322	939	617	5742	1149	4916	5720	2603	4239	4883	11270	4776	6735	912
	323	349	226	318	1156	572	3671	3683	2670	4576	1907	1668	1621	95
	324	(479)	(611)	(570)	0	(1845)	2605	3147	1607	727	237	3164	1878	85
	Total	5168	8938	12715	11288	24446	28463	49128	16153	53531	41763	36024	42464	17454
181-270	306	765	870	698	9691	2841	6333	947	278	14560	2956	2589	3935	2759
	309	355	1642	264	1453	595	1500	1588	872	4906	831	2859	5852	13611
	310	396	186	15	489	1095	935	105	9513	175	382	2276	146	553
	313	130	328	11	859	814	678	83	2359	138	1432	23	1639	995
	316	65	95	39	165	423	30	173	4088	826	215	667	4871	6236
	318	21	8	(191)	247	34	1182	604	576	5810	101	2786	1097	1936
	Total	1732	3129	1218	12904	5802	10658	3500	17686	26415	5917	11200	17540	26090
271-365	705	254	982	27	423	3286	672	908	69	224	220	274	267	87
	706	22	0	98	672	3054	179	532	163	1981	8977	791	158	717
	707	(140)	586	(166)	13	2603	183	19	827	1172	81	80	51	73
	715	922	597	895	628	2473	588	1636	917	1132	961	882	276	2048
	716	123	357	923	455	1772	1196	1058	25	2258	5353	4836	406	1707
	Total	1461	2522	2109	2191	13188	2818	4153	2001	6767	15592	6863	1158	4632
366-545	708	(52)	(68)	(63)	45	353	8	4	315	381	1543	88	172	297
	711				0		33						0	823
	712				0		133						0	2466
	713				21		-						0	1854
	714				137		0						0	9877
	Total	52	68	63	203	353	174	4	315	381	1543	88	172	15317
0-545	Total	9775	16115	16960	29249	45585	43544	68833	36638	88206	67194	56614	61608	63707

Table 13 - Estimated cod abundance (in thousands) in Subdivision 3 Ps from french stratified surveys, yearly conducted in late winter (February-March).

Age	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1		.07		.06	1.03	4.63	.03	.13	.08	3.29	5.27	1.87	.38
2	.73	.43	7.38	.18	12.00	10.79	11.58	5.49	7.24	20.62	14.86	24.70	3.11
3	1.57	.39	1.72	4.91	1.96	5.40	7.64	14.49	4.21	11.51	14.89	16.02	21.84
4	3.08	2.08	.50	4.94	8.32	2.98	15.07	7.47	15.19	2.83	9.22	8.20	20.12
5	2.05	7.29	2.67	5.14	7.97	7.21	8.74	3.93	26.47	8.30	3.62	5.81	5.64
6	1.20	3.27	4.52	7.45	6.06	6.11	18.97	1.06	21.66	12.49	6.53	3.48	1.20
7	.89	1.82	1.66	5.64	4.55	4.55	5.59	1.95	9.12	8.32	4.69	4.43	.29
8	.52	.96	.67	1.60	5.30	2.77	2.13	1.14	6.97	2.95	1.60	2.03	.49
9	.30	.38	.29	1.19	1.58	2.08	3.09	.78	3.85	1.94	.78	1.01	.32
10	.22	.22	.22	.47	.87	.75	2.21	.86	.79	.95	.35	.27	.17
11	.02	.29	.18	.15	.42	.25	.61	1.09	.59	.20	.35	.13	.08
12	.04	.09	.11	.14	.15	.19	.16	1.32	.72	.36	.16	.06	.07
13	.01	.10	.08	.06	.21	.08	.13	.12	.22	.15	.15	.07	.01
14+	.03	.22	.18	.13	.10	.06	.12	.23	.32	.29	.33	.08	.05
3+	9.94	17.12	12.80	31.82	37.49	32.42	64.46	34.43	90.11	50.25	42.64	41.59	50.28
6+	3.23	7.35	7.92	16.83	19.23	16.84	33.00	8.55	44.25	27.62	14.93	11.56	2.68
Total	10.72	17.71	20.25	32.14	50.59	47.92	76.11	40.05	97.47	74.24	62.76	68.16	53.77
N° sets	69	64	40	83	74	88	74	84	82	69	73	106	107
	Feb.21 Mar.25	Feb.21 Mar.20	Mar. 03-12	Feb.24 Mar.31	Mar.5 April 2	Feb.10 Mar.19	Feb.15 Mar.19	Feb.09 Mar.10	Feb.09 Mar.10	Feb.04 Mar.06	Feb.09 Mar.11	Feb.15 Mar.18	Feb.26 Mar.28

Table 14 - Average number of cods per set and age in late winter surveys (strata 306 to 325, 705-708, 715, 716) in Subdivision 3 Ps.

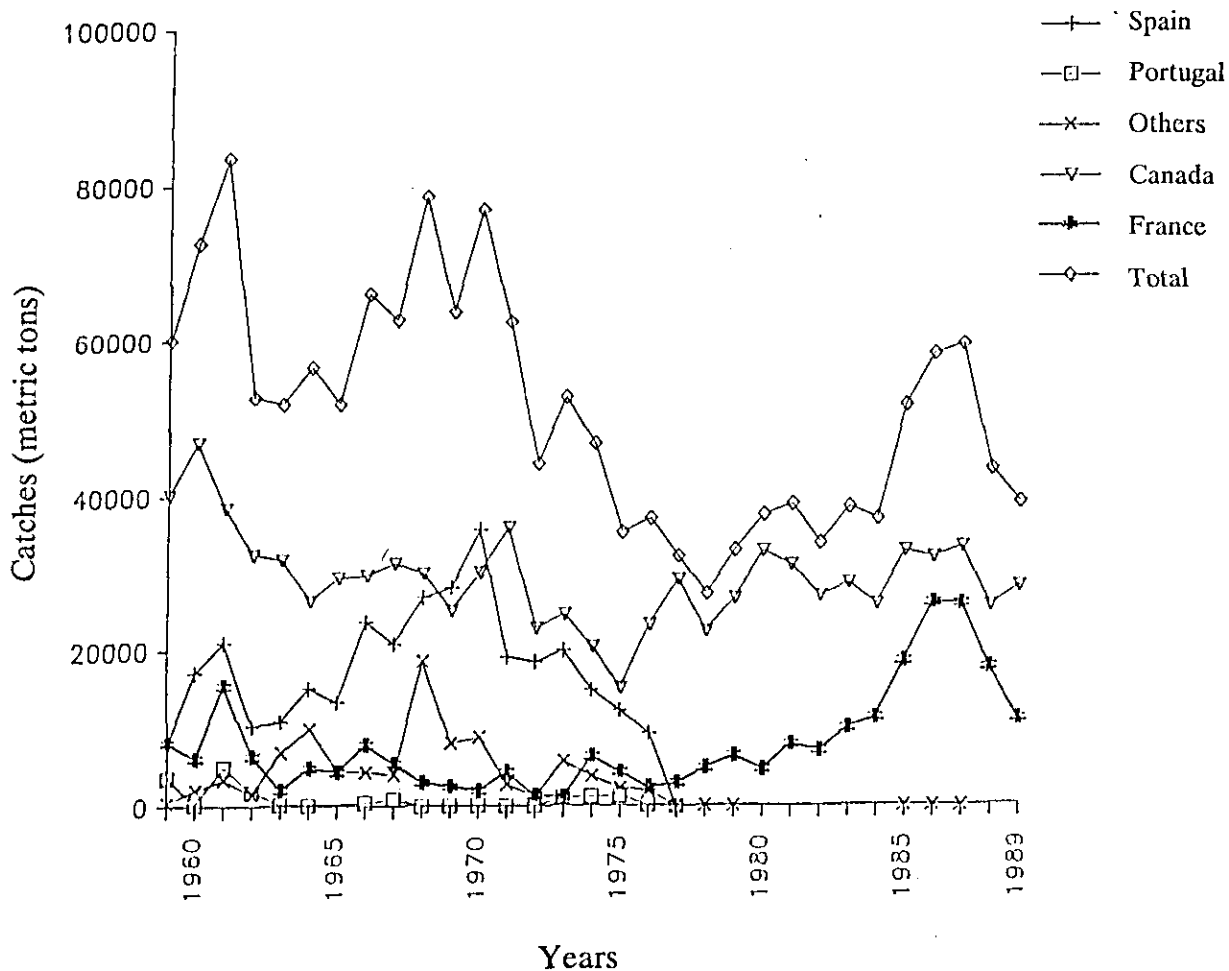


Figure 1 - Evolution in international cod catches in NAFO Subdivision 3 Ps from 1959 to 1989.

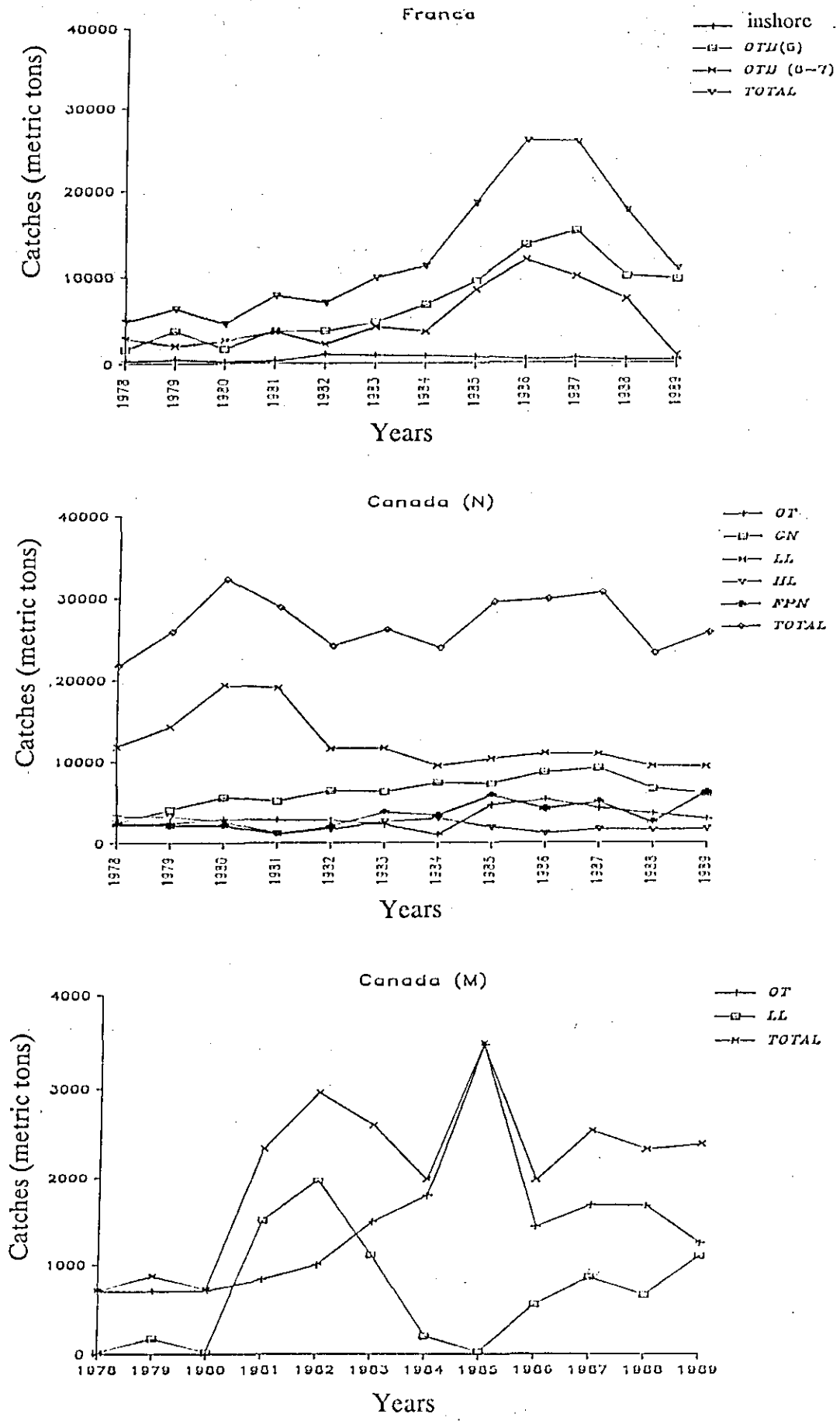


Figure 2 - Evolution in french and canadian cod catches (N : Newfoundland, M : Maritimes) by main gear in NAFO Subdivision 3 Ps from 1978 to 1989.

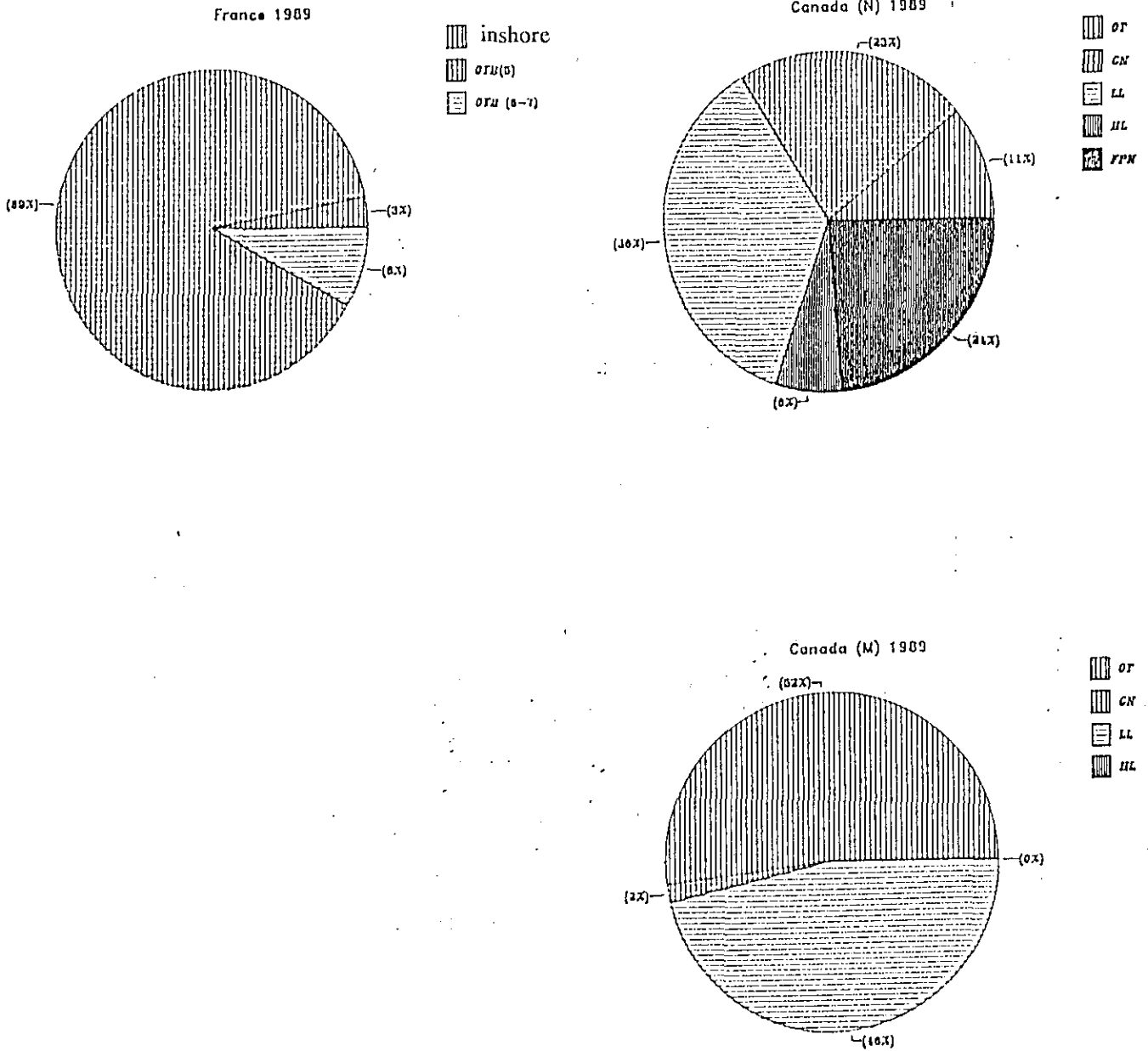


Figure 3 - Composition (%) of french and canadian cod catches by main gear in NAFO Subdivision 3 Ps in 1989.

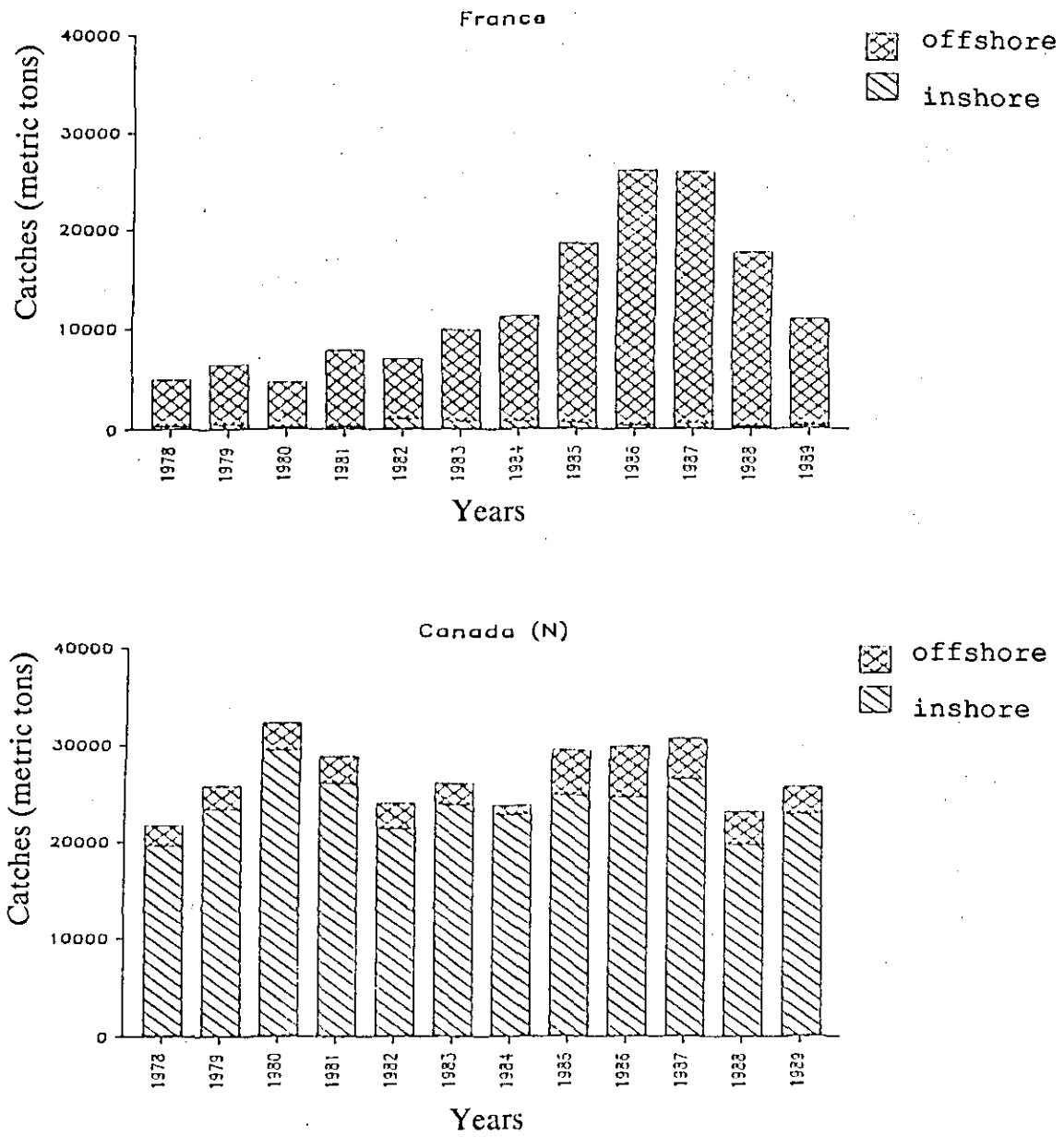
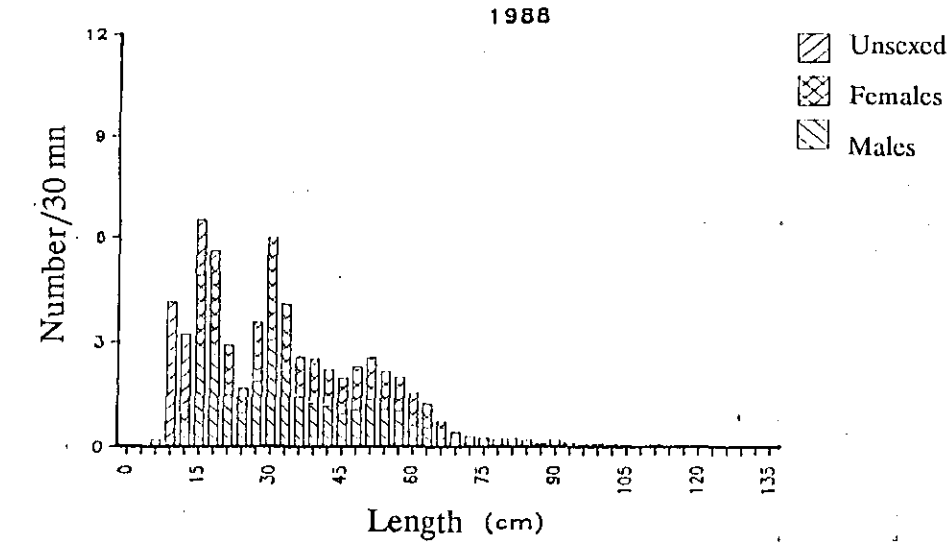
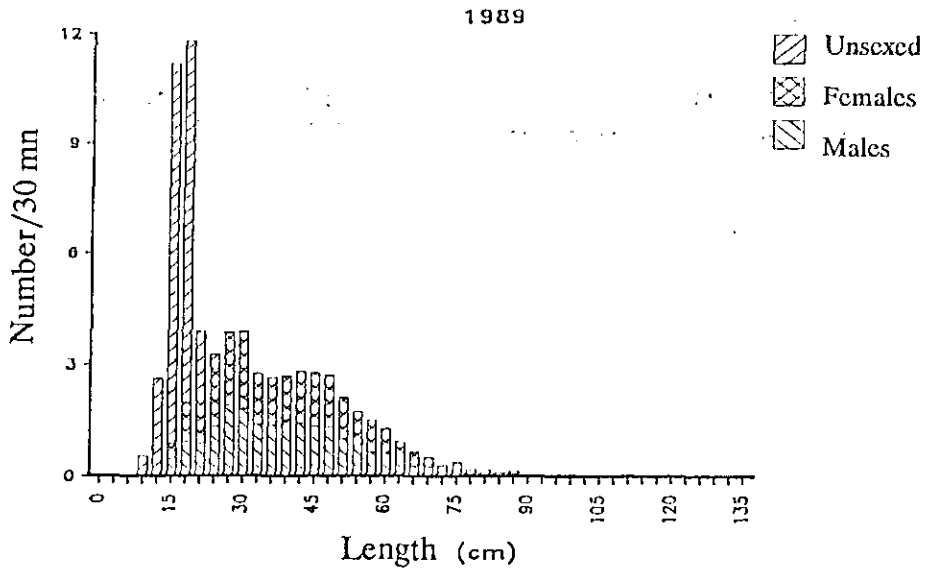


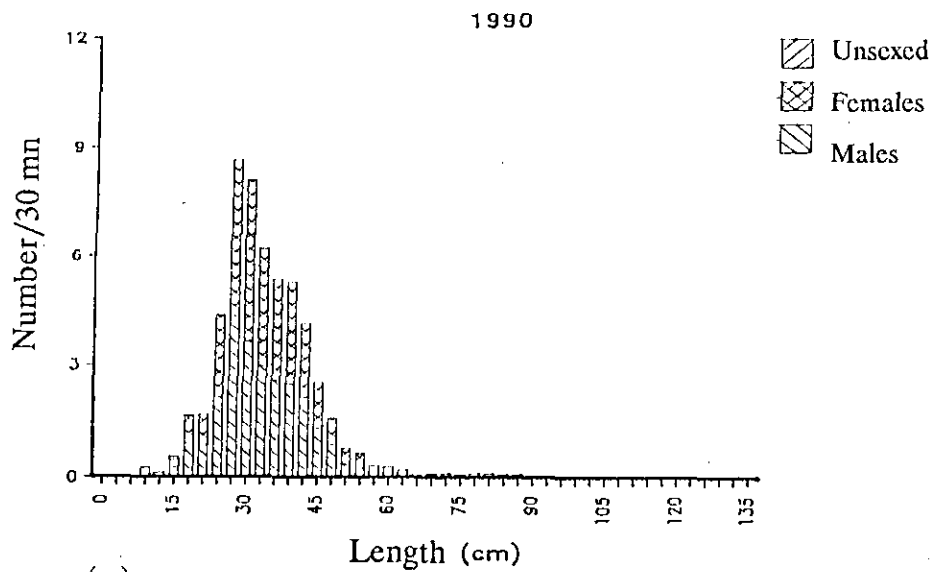
Figure 4 - Evolution in french and canadian (N) cod catches for inshore and offshore fisheries in NAFO Subdivision 3 Ps from 1978 to 1989.



(a)



(b)



(c)

Figure 5 - Length distribution of cod catches (strata 306-325, 705-708, 715, 716) from french surveys in NAFO Subdivision 3 Ps from 1988 to 1990.