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A stock status update of American plaice in NAFO Divisions 3LNO

by

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Abstract

Catches from this stock were generally in the range of 40,000 to 50,000 t per year throughout the 1970's and 1980's, before declining to low levels in the early 1990's. There has been no directed fishing on this stock since 1993. The TAC's in 1995 to 2000 have been set at 0. The catch in 1999 was 2,565 t, an increase of more than 900 t from 1998. Catches in 1999 were mainly in the NAFO Regulatory Area (NRA) and as bycatch in the Canadian yellowtail flounder fishery. The Canadian spring surveys show a large decline in abundance and biomass from the mid to late 1980's with current biomass being only 26% of that of the mid 1980's. The fall survey has also shown large declines and the biomass is only 34% of that of 1990.

TAC Regulation

This stock has been under TAC regulation since 1973 when a TAC of 60,000 t was established. From 1973-87, the TAC varied from 47,000 t to 60,000 t (Table 1) but was lowered to 33,585 t in 1988. Further reductions followed, bringing the TAC to 10,500 t in 1993. In 1994, a TAC of 4,800 t was implemented, but the Fisheries Commission of NAFO stated that no directed fisheries were to take place on this stock. The TAC has been set at 0 since then.

Catch Trends

Catches increased from about 20,000 t in the early 1960s to a peak of 94,000 t in 1967, were relatively stable around 45,000-50,000 t in 1973-82, then declined to 39,000 t in 1984-85 (Table 1, Fig. 1). Catches increased to 65,000t in 1986 and then declined rapidly thereafter, to about 7,400 t in 1994. The catch declined following the moratorium in 1995, but has steadily increased from 637 t in 1995, to 913 t in 1996, 1407 t in 1997, 1618 t in 1998 and 2565 t in 1999. Most of these catches occurred as by catch in the G. halibut and skate fisheries in the NRA.

Canadian Research Vessel Surveys

Spring

Stratified-random surveys have been carried out on the Grand Bank on Canadian research vessels in the spring (April to June period) of each year from 1971 to 1998, with the exception of 1983. The data can be split into 3 time periods, based on the trawl used in each period: 1971-82 was Yankee 36, 1983-95 was Engel 145, and 1996-98 was Campelen 1800 (see McCallum and Walsh (1996) for a description of the various trawls). Conversions exist for the first to second series (Gavaris and Brodie 1984), and from the second to the third (Morgan et al. 1998). However, data from the first series have not been converted to be comparable with the third series. Thus comparable data exist for 1971-95, and for 1984 to 1998. A full comparison between the Engel and Campelen data series is given in Brodie et al. (1998).

Abundance in the spring survey decreased steadily from 1987 to 1992 and has been fairly stable since then (Fig. 2). There was an increase in abundance between 1998 and 1999. Biomass from the spring survey has shown the same trend (Fig. 3, Tables 2-4). The increase in abundance and biomass in 1999 may be related to the warmer than average temperatures during the survey. The spring survey abundance index in 1999 was 28% of the average level in the mid-1980's and the biomass index 26% of the average level in the mid-1980's.

American plaice are distributed throughout the Div. 3LNO area but the largest concentration of fish in each year since 1996 has been in the southwestern portion of Div. 3O extending across the border into Div. 3N (Fig. 4). In 1999 the distribution was more similar to the fall distribution in recent years.

Fall

Stratified-random surveys have been conducted in Div. 3L in the fall from 1981 to 1998, usually in October-November. From 1990 to 1998, fall surveys were also carried out in Div. 3NO. Surveys from 1983 to 1994 were done with the Engel trawl and starting in fall 1995, a Campelen 1800 trawl was used.

Abundance in the fall survey decreased steadily from 1990 to 1998 followed by a slight increase in 1999 (Fig. 2). Biomass in the fall survey decreased from 1990 to 1995 and has been fairly stable since then with a slight increase in 1998 (Fig. 3, Tables 5-7). The 1998 and 1999 estimates are virtually identical. The fall survey abundance index was 31% of the average level of 1990 and 1991 and the biomass index was 34% of that level.

Plots of distribution by weight (Fig. 5) for the fall surveys in 1995 to 1999 show that A. plaice are distributed throughout the Div. 3LNO area. The area of highest concentration is southern 3NO, particularly the southwest edge, similar to the spring. However, more of the fish tend to be distributed in 3N as compared to the spring.

Stock Status

The increase in the spring survey in 1999 was not reflected in the fall survey. Both survey indices are only a fraction of their level at the beginning of the time series. The stock remains at a low level compared to historic values.

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Table 1. Nominal catches (t) of American plaice for NAFO Divisions 3LNO, 1960-96 and TACs from 1973 to 1998.

Year	Canada	France	Poland	USSR/Russia	South Korea ^a	Other	Total	TAC
1960	21,352	2,106	-	569	-	20	24,047	-
1961	14,903	1,473	286	1,248	-	3	17,913	-
1962	15,217	973	171	1,841	-	4	18,206	-
1963	24,591	93	457	466	-	112	25,719	-
1964	35,474	1,582	539	680	-	292	38,567	-
1965	45,365	2,056	977	4,544	-	319	53,261	-
1966	51,225	1,246	860	11,484	-	196	65,011	-
1967	54,190	1,326	3,234	35,139	-	524	94,413	-
1968	48,674	406	203	23,751	-	133	73,167	-
1969	64,815	43	34	14,493	-	52	79,437	-
1970	54,929	389	40	10,232	-	1,055	66,645	-
1971	49,394	323	370	17,173	-	628	67,888	-
1972	41,605	322	2,515	14,164	-	755	59,361	-
1973	38,586	310	1,116	12,516	-	315	52,843	60,000
1974	35,101	418	615	10,074	-	89	46,297	60,000
1975	34,015	442	537	7,682	-	545	43,221	60,000
1976	47,806	305	5	3,280	-	429	51,825	47,000
1977	42,579	31	-	1,023	-	348	43,981	47,000
1978	48,634	168	-	1,048	-	178	50,028	47,000
1979	47,131	113	-	1,190	-	135	48,569	47,000
1980	48,296	183	-	336	-	271	49,086	47,000
1981	48,177	210	-	847	-	924	50,158	55,000
1982	49,620	133	-	67	715	517	51,052	55,000
1983	35,907	41	-	170	815	1,602	38,535	55,000
1984	33,756	140	1	360	1,582	3,606 ^b	39,445	55,000
1985	40,024	-	4	81	2,483	11,620 ^b	54,212	49,000
1986	33,409	46	-	188	3,952	26,975 ^b	64,570	55,000
1987	33,967	17	-	47	2,741	18,240	55,012	48,000
1988	26,832	-	-	159	2,522	11,322 ^b	40,835	33,585 ^d
1989	27,901	92	-	6	725	14,645 ^b	43,369	30,300
1990	22,600	-	-	17	1,117	8,767 ^b	32,501	24,900
1991	23,240 ^a	-	-	60	1,910	9,471 ^b	34,681	25,800
1992	10231 ^a	-	-	50	518	2,551 ^b	13,350	25,800
1993 ^c	7,454	-	-	8	13	9,659 ^b	17,122	10,500
1994 ^e	71	-	-	-	100	7,207 ^b	7,378	4.8 ^f
1995 ^e	59	-	-	-	-	578 ^b	637	0
1996 ^e	59	-	-	-	-	854 ^b	913	0
1997 ^e	114	-	-	-	-	1,293 ^b	1401	0
1998 ^e	212	-	-	10	-	1,396 ^b	1618	0
1999 ^e	316	-	-	147	-	2,102 ^b	2565	0
2000								0

^aIncludes a portion of catches reported as unspecified flounder. See text for details.

^bIncludes some catches estimated from surveillance reports.

^cCatch may have been as high as 19,400.

^dEffective TAC.

^eProvisional.

^fNo directed fishing.

Table 2. Biomass estimates ('000t) of A.plaice, by stratum and depth zone (m), from Canadian spring surveys in Div. 3L in 1996-99 (Campelen). (+) indicates biomass <50 t, (-) means stratum not surveyed.

Biomass						Biomass					
Depth	Stratum	Spring 1996	Spring 1997	Spring 1998	Spring 1999	Depth	Stratum	Spring 1996	Spring 1997	Spring 1998	Spring 1999
30-56	784	-	-	0.2	+	367-549	729	0.2	0.6	2.2	0.1
	Total	-	-	0.2	+		731	0.5	0.1	+	0.1
57-92	350	0.6	0.3	0.3	6.1		733	0.7	0.0	0.3	1
	363	2.3	0.8	0.0	3.2		735	1.4	1.6	1.2	0.6
	371	0.9	0.2	0.1	2.4		Total	2.8	2.4	3.7	1.8
	372	1.4	0.8	1.3	2.7	550-731	730	+	0.0	0.2	+
	384	0.7	0.9	0.2	0.8		732	+	0.0	0.0	+
	785	-	-	0.2	0.5		734	+	0.0	0.1	0
Total	5.9	3.0	2.1	15.7	736		+	0.1	0.0	+	
93-183	328	0.5	0.5	0.1	2.4	Total	0.1	0.1	0.3	+	
	341	1.8	0.5	0.7	4.5	732-914	737	-	-	-	-
	342	0.1	0.1	0.4	0.4		741	-	-	-	-
	343	0.3	0.0	+	0.6		745	-	-	-	-
	348	1.4	0.8	1.2	2.8		748	-	-	-	-
	349	0.8	0.3	0.2	4.4	Total	-	-	-	-	
	364	2	1.0	0.9	5.6	915-1097	738	-	-	-	-
	365	1.1	0.5	0.9	1.4		742	-	-	-	-
	370	1.3	0.6	1.6	2.4		746	-	-	-	-
	385	5.6	0.9	0.5	2.5		749	-	-	-	-
	390	0.6	0.4	0.5	0.3	Total	-	-	-	-	
	786	-	-	0.3	0.5	1098-1280	739	-	-	-	-
	787	-	-	0.5	0.8		743	-	-	-	-
	788	-	-	-	0.3		747	-	-	-	-
	790	-	-	-	+		750	-	-	-	-
	793	-	-	-	+		Total	-	-	-	-
	794	-	-	-	+		1281-1463	740	-	-	-
797	-	-	-	+	744			-	-	-	-
799	-	-	-	-	751			-	-	-	-
Total	15.5	5.5	7.8	28.9	Total	-		-	-	-	
184-274	344	1	0.3	0.8	1.8	Grand Total	30.7	13.8	19.0	57.3	
	347	0.6	0.2	0.6	0.6						
	366	0.4	0.3	0.3	0.5						
	369	0.3	0.2	0.2	1.2						
	386	0.5	0.2	0.4	1.4						
	389	0.4	0.2	0.4	0.6						
	391	0.3	0.1	0.2	0.1						
	789	-	-	-	0.5						
	791*	-	-	-	0.3						
	795	-	-	-	0.1						
	798	-	-	-	0.1						
Total	3.5	1.5	2.9	7.2							
275-366	345	0.5	0.2	0.3	1.5						
	346	0.4	0.3	0.2	0.2						
	368	0.3	0.0	0.1	0.3						
	387	0.6	0.6	0.8	0.4						
	388	0.6	0.2	0.2	0.8						
	392	0.5	0.1	0.4	0.2						
	792	-	-	-	+						
	796	-	-	-	0.1						
800	-	-	-	0.2							
Total	2.9	1.4	2.0	3.7							

* in 1996 had a depth range of 184-366

Table 3. Biomass estimates ('000t) of A.plaice, by stratum and depth zone (m), from Canadian spring in Div. 3N in 1996-99 (Campelen). (+) indicates biomass <50 t, (-) means stratum not surveyed.

Biomass						Biomass						
Depth	Stratum	Spring 1996	Spring 1997	Spring 1998	Spring 1999	Depth	Stratum	Spring 1996	Spring 1997	Spring 1998	Spring 1999	
<56	375	2.9	2.2	1.1	1.8	732-914	752	-	-	-	-	
	376	0.8	1.8	2.0	3.2		756	-	-	-	-	
	Total	3.7	4.0	3.1	5.0		760	-	-	-	-	
57-92	360	8.8	8.6	7.9	27.4	915-1097	753	-	-	-	-	
	361	3.8	1.9	2.0	5.5		757	-	-	-	-	
	362	2.8	5.5	4.0	4.6		761	-	-	-	-	
	373	1.6	0.5	0.9	8.3		Total	-	-	-	-	
	374	1.1	0.4	0.3	1.7		1098-1280	754	-	-	-	-
	383	0.5	0.1	+	1.0		758	-	-	-	-	
Total	18.6	17.0	15.1	48.5	Total	-	-	-	-			
93-183	359	1.1	1.1	1.6	3.3	1281-1463	755	-	-	-	-	
	377	0.2	0.1	+	0.2		759	-	-	-	-	
	382	0.1	0.1	0.7	0.2		Total	-	-	-	-	
Total	1.4	1.3	2.3	3.7	Grand Total		26.0	27.4	25.5	59.5		
184-274	358	0.1	0.1	1.4	0.3							
	378	0.1	0.2	0.2	0.9							
	381	0.3	0.1	0.1	0.2							
Total	0.5	0.4	1.7	1.4								
275-366	357	0.1	0.1	0.1	+							
	379	+	0.1	0.1	0.1							
	380	0.2	0.8	0.1	0.2							
Total	0.3	1.0	0.3	0.3								
367-549	723	0.2	0.4	0.3	+							
	725	0.1	0.5	0.2	+							
	727	0.5	2.2	2.0	0.4							
Total	0.8	3.1	2.5	0.4								
550-731	724	0.2	0.5	0.2	+							
	726	+	0.1	+	+							
	728	0.5	-	0.3	0.2							
Total	0.7	0.5	0.5	0.2								

Table 4. Biomass estimates ('000t) of A.plaice, by stratum and depth zone (m), from Canadian spring surveys in Div. 3O in 1996-99 (Campelen). (+) indicates biomass <50 t, (-) means stratum not surveyed.

Biomass						Biomass					
Depth	Stratum	Spring 1996	Spring 1997	Spring 1998	Spring 1999	Depth	Stratum	Spring 1996	Spring 1997	Spring 1998	Spring 1999
57-92	330	3.8	0.8	6.9	3.5	732-914	764	-	-	-	-
	331	1.4	0.3	0.3	2.7		768	-	-	-	-
	338	6.0	5.7	6.0	4.0		772	-	-	-	-
	340	2.2	1.7	1.8	2.9		Total	-	-	-	-
	351	2.9	4.4	3.8	4.6	915-1097	765	-	-	-	-
	352	9.1	13.8	10.6	14.2		769	-	-	-	-
	353	7.8	8.3	10.9	21.5		773	-	-	-	-
	Total	33.2	34.9	40.3	53.4		Total	-	-	-	-
93-183	329	1.6	1.4	4.4	4.7	Grand Total		49.0	51.2	57.7	75.1
	332	3.9	2.5	3.8	2.2						
	337	4.6	1.9	3.2	2.7						
	339	1.4	0.8	0.8	2.1						
	354	1.6	1.1	5.0	9.0						
	Total	13.1	7.8	17.2	20.7						
184-274	333	+	0.3	0.1	0.1						
	336	0.2	0.3	+	0.2						
	355	0.5	0.3	0.1	0.1						
	Total	0.7	0.9	0.2	0.4						
275-366	334	0.2	0.8	0.0	0.1						
	335	0.2	0.2	0.0	+						
	356	0.1	+	+	0.1						
	Total	0.5	1.0	+	0.2						
367-549	717	0.2	1.7	+	0.1						
	719	0.1	0.5	+	+						
	721	0.2	0.1	+	0.1						
	Total	0.5	2.2	+	0.2						
550-731	718	+	0.1	+	+						
	720	+	0.1	+	+						
	722	1.0	4.2	0.0	0.2						
	Total	1.0	4.4	+	0.2						

Table 5. Biomass estimates ('000t) of A.plaice, by stratum and depth zone (m), from Canadian fall surveys in Div. 3L in 1995-99 (Campelen). (+) indicates biomass <50 t, (-) means stratum not surveyed.

Biomass							Biomass						
Depth	Stratum	Fall 1995	Fall 1996	Fall 1997	Fall 1998	Fall 1999	Depth	Stratum	Fall 1995	Fall 1996	Fall 1997	Fall 1998	Fall 1999
30-56	784	-	+	+	0.0	-	367-549	729	+	+	0.2	0.1	0.7
	Total	-	+	+	0.0	-		731	0.2	-	0.6	0.1	1.0
57-92	350	0.8	0.9	0.5	1.1	1.0		733	0.2	0.2	0.5	0.6	0.3
	363	3.1	2.0	1.4	2.1	1.9		735	0.7	0.7	0.3	0.8	1.9
	371	1.2	1.1	0.2	0.5	0.4		792	-	0.2	1.9	0.3	-
	372	1.4	1.6	1.5	0.3	1.7		Total	1.1	1.1	3.6	1.9	3.9
	384	1.6	1.6	0.5	0.2	1.5	550-731	730	+	0.0	0.5	0.1	0.2
	785	-	+	+	+	-		732	+	+	1.3	0.2	1.9
	Total	8.1	7.2	4.0	4.2	6.5		734	0.0	0.2	0.3	0.1	0.1
93-183	328	3.0	1.6	0.9	0.5	2.0		736	0.2	0.5	0.8	0.6	0.6
	341	1.6	2.8	0.8	2.1	0.6		Total	0.2	0.7	2.8	1.0	2.8
	342	0.6	+	0.4	0.2	-	732-914	737	0.4	1.5	1.8	3.3	0.8
	343	0.7	0.1	0.0	0.1	-		741	-	1.0	2.3	1.7	0.1
	348	3.1	1.8	1.3	1.5	1.4		745	-	0.1	2.2	0.1	0.7
	349	3.4	1.4	1.5	0.8	0.4		748	-	1.4	0.7	0.0	1.1
	364	2.8	3.6	2.6	5.2	1.2		Total	0.4	4.0	7.0	5.1	2.7
	365	1.7	1.1	1.0	1.4	1.0	915-1097	738	0.6	0.2	0.0	0.0	0.0
	370	2.0	6.3	1.3	4.6	3.9		742	-	0.1	0.0	0.0	+
	385	3.9	7.6	1.9	4.0	2.9		746	-	0.1	0.0	+	0.0
	390	1.7	1.6	2.2	3.3	2.1		749	-	+	0.2	0.0	-
	786	-	0.3	0.1	0.1	-		Total	0.6	0.4	0.2	+	+
	787	-	0.4	0.5	0.1	-	1098-1280	739	-	0.0	0.0	0.0	0.0
	788	-	0.3	0.3	0.1	-		743	-	0.0	0.0	0.0	0.0
	790	-	0.2	0.2	+	-		747	-	0.0	0.0	0.1	+
	793	-	0.1	0.1	0.1	-		750	-	0.1	0.0	0.0	0.0
	794	-	+	0.1	+	-		Total	-	0.1	0.0	0.1	+
	797	-	0.1	0.1	+	-	1281-1463	740	-	0.0	0.0	0.0	0.1
	799	-	0.1	0.1	+	-		744	-	0.5	0.0	0.1	-
	Total	24.5	29.4	15.6	24.1	15.5		751	-	0.0	0.0	0.0	-
184-274	344	1.0	1.1	0.1	0.5	0.5		Total	-	0.5	0.0	0.1	0.1
	347	1.8	0.7	0.3	0.8	0.5	Grand Total		50.9	57.5	43.3	48.6	44.8
	366	1.6	1.2	0.5	0.8	1.7							
	369	1.0	1.6	0.5	1.8	1.6							
	386	1.8	2.6	1.0	0.9	1.2							
	389	0.6	0.6	0.6	0.7	0.6							
	391	0.4	0.2	0.2	0.2	0.3							
	789	-	0.2	0.2	0.1	-							
	791*	-	0.5	0.4	0.1	-							
	795	-	+	0.2	0.4	-							
	798	-	0.2	0.7	0.3	-							
	Total	8.2	8.9	4.6	6.6	6.4							
275-366	345	4.1	2.4	0.8	2.5	1.3							
	346	2.8	1.1	2.2	1.7	1.7							
	368	0.2	0.3	0.2	0.4	0.7							
	387	0.4	0.7	0.7	0.2	1.8							
	388	0.3	0.1	0.4	+	0.9							
	392	+	+	0.2	0.1	0.5							
	796	-	0.6	0.9	0.4	-							
	800	-	-	-	0.2	-							
	Total	7.8	5.2	5.5	5.5	6.9							

* in 1996 stratum 791 covered a depth range of 184-366 m

Table 6. Biomass estimates ('000t) of A.plaice, by stratum and depth zone (m), from Canadian fall surveys in Div. 3N in 1995-99 (Campelen). (+) indicates biomass <50 t, (-) means stratum not surveyed.

Biomass							Biomass						
Depth	Stratum	Fall 1995	Fall 1996	Fall 1997	Fall 1998	Fall 1999	Depth	Stratum	Fall 1995	Fall 1996	Fall 1997	Fall 1998	Fall 1999
≤ 56	375	1.9	1.1	3.9	5.2	0.6	732-914	752	-	-	-	1.5	-
	376	4.7	2.4	7.7	4.4	4.3		756	-	-	-	0.1	-
	Total	6.6	3.5	11.6	9.6	4.9		760	-	-	-	0.0	-
57-92	Total						Total					0	-
	360	22.3	7.4	28.4	39.2	43.4	915-1097	753	-	-	-	+	-
	361	3.5	4.1	3.3	2.1	1.8		757	-	-	-	0.0	-
	362	5.0	1.1	5.1	2.9	2.9		761	-	-	-	0.0	-
	373	1.8	0.2	2.3	1.7	4.2		Total	-	-	-	+	-
	374	2.4	0.4	1.8	1.3	2.7		1098-1280	754	-	-	-	0.0
383	-	0.3	0.5	0.8	0.8	758	-	-	-	0.0	-		
Total	35.0	13.5	41.4	48.0	55.8	Total	-	-	-	0.0	-		
93-183	359	2.2	0.3	3.8	11.6	9.8	1281-1463	755	-	-	-	0.0	-
	377	0.5	0.4	2.3	1.1	0.9		759	-	-	-	0.0	-
	382	0.3	0.3	0.8	6.1	2.7	Total	-	-	-	0.0	-	
Total	3.0	1.0	6.9	18.8	13.4	Grand Total		46.0	20.9	61.0	77.3	78.1	
184-274	358	0.8	0.2	0.4	0.3	0.3							
	378	0.1	0.2	0.1	0.1	0.4							
	381	0.1	0.4	0.2	0.1	0.3							
Total	1.0	0.8	0.7	0.5	1.0								
275-366	357	0.1	0.1	0.0	+	-							
	379	+	0.2	0.1	+	0.3							
	380	0.1	0.2	0.1	0.1	0.7							
Total	0.2	0.5	0.2	0.1	1.0								
367-549	723	+	+	0.0	0.1	+							
	725	0.1	0.1	0.0	+	0.1							
	727	+	0.1	0.1	0.1	1.5							
Total	0.1	0.2	0.2	0.2	1.6								
550-731	724	0.1	0.3	0.0	0.0	0.1							
	726	+	0.3	0.1	+	+							
	728	+	0.8	0.1	0.1	0.3							
Total	0.1	1.4	0.2	0.1	0.4								

Table 7. Biomass estimates ('000t) of A.plaice, by stratum and depth zone (m), from Canadian fall surveys in Div. 3O in 1995-99 (Campelen). (+) indicates biomass <50 t, (-) means stratum not surveyed.

Biomass						Biomass							
Depth	Stratum	Fall 1995	Fall 1996	Fall 1997	Fall 1998	Fall 1999	Depth	Stratum	Fall 1995	Fall 1996	Fall 1997	Fall 1998	Fall 1999
57-92	330	7.7	0.8	5.5	5.9	5.4	732-914	764	-	-	-	0.0	-
	331	1.2	0.3	0.9	1.8	1.0		768	-	-	-	0.0	-
	338	6.6	3.3	6.4	3.4	3.8		772	-	-	-	0.0	-
	340	7.2	0.4	3.2	1.1	2.8	Total	-	-	-	0.0	-	
	351	1.7	0.9	5.2	3.3	2.9	915-1097	765	-	-	-	0.0	-
	352	4.6	9.1	6.9	8.4	3.2		769	-	-	-	0.0	-
	353	5.6	14.4	14.8	19.3	10.3		773	-	-	-	0.0	-
Total	34.6	29.2	42.9	43.2	29.4	Total	-	-	-	0.0	-		
93-183	329	3.2	1.5	2.7	5.0	6.6	Grand Total		54.9	75.2	57.5	58.7	66.9
	332	3.5	3.9	1.6	3.9	1.9							
	337	2.4	25.3	2.5	1.5	1.4							
	339	6.5	0.9	5.1	1.4	-							
	354	4.5	8.0	2.4	3.7	27.0							
Total	20.1	39.6	14.4	15.5	36.9								
184-274	333	+	-	+	+	0.1							
	336	+	0.1	0.1	+	0.1							
	355	0.2	5.4	0.1	+	0.3							
Total	0.2	5.5	0.2	+	0.5								
275-366	334	0.0	-	+	+	+							
	335	+	+	+	+	+							
	356	0.0	0.1	+	+	+							
Total	+	0.1	0.1	+	0.1								
367-549	717	0.0	-	+	0.0	+							
	719	+	0.2	0.0	+	+							
	721	+	0.6	0.0	0.0	+							
Total	+	0.8	+	+	+								
550-731	718	0.0	-	0.0	+	0.0							
	720	0.0	+	-	+	+							
	722	0.0	+	0.0	0.0	+							
Total	0.0	+	0.0	+	+								

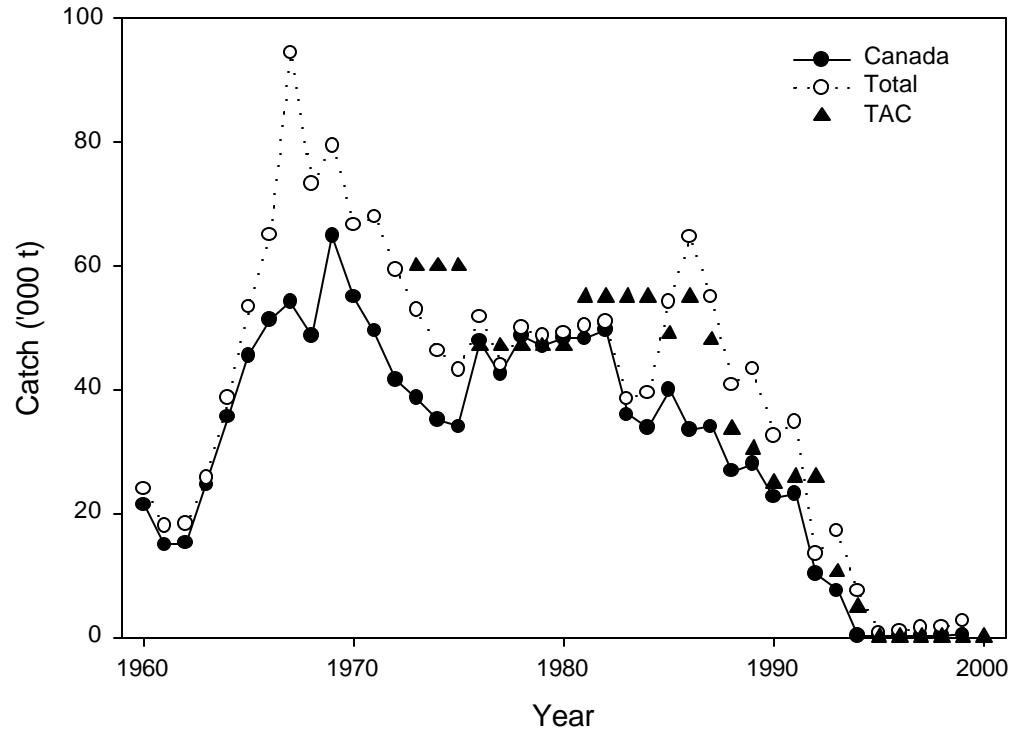


Figure 1. Catches and TAC's of American plaice in Div. 3LNO.

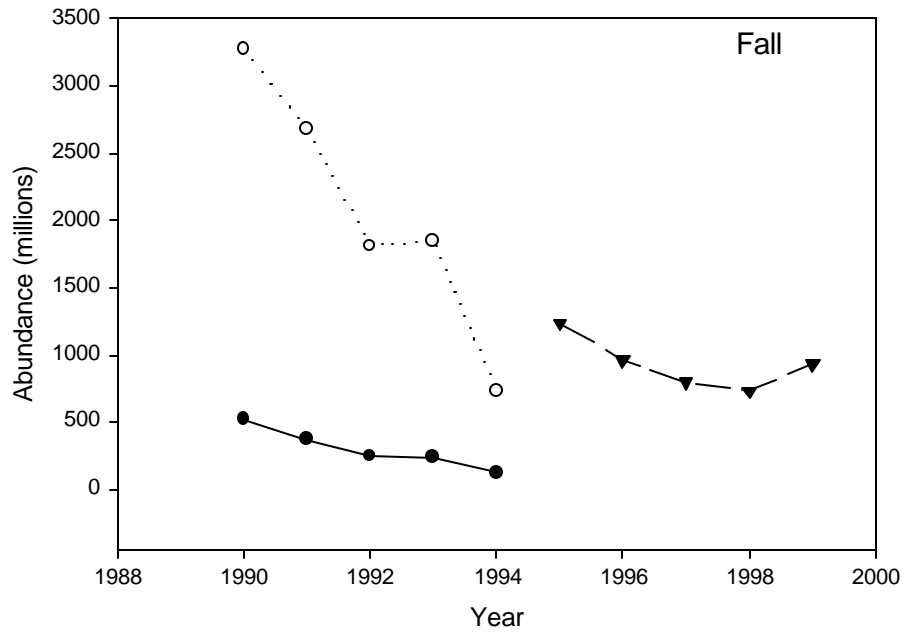
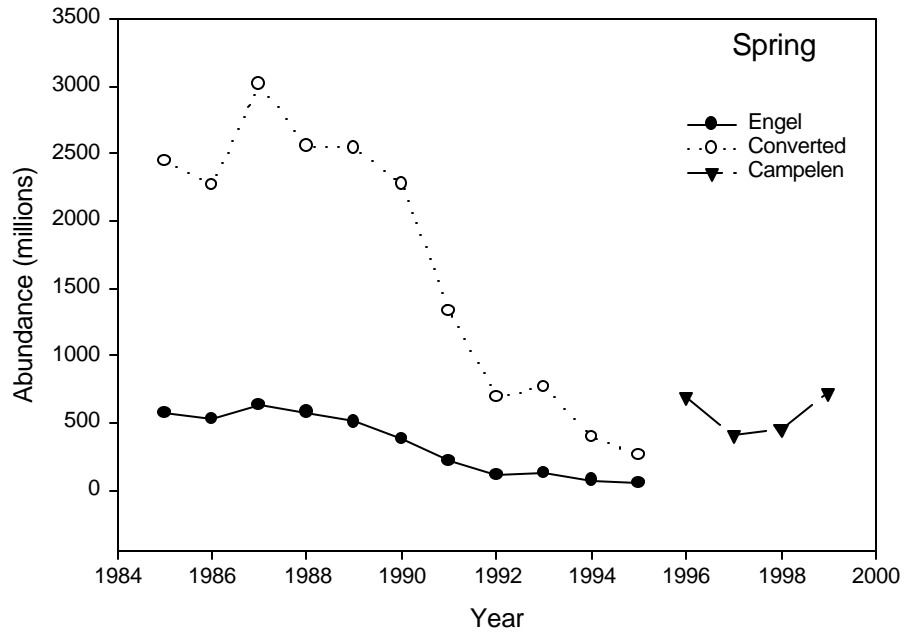


Figure 2. Abundance index for Div. 3LNO American plaice from Canadian spring and fall surveys. Engel data, data converted to Campelen equivalents and Campelen data are shown.

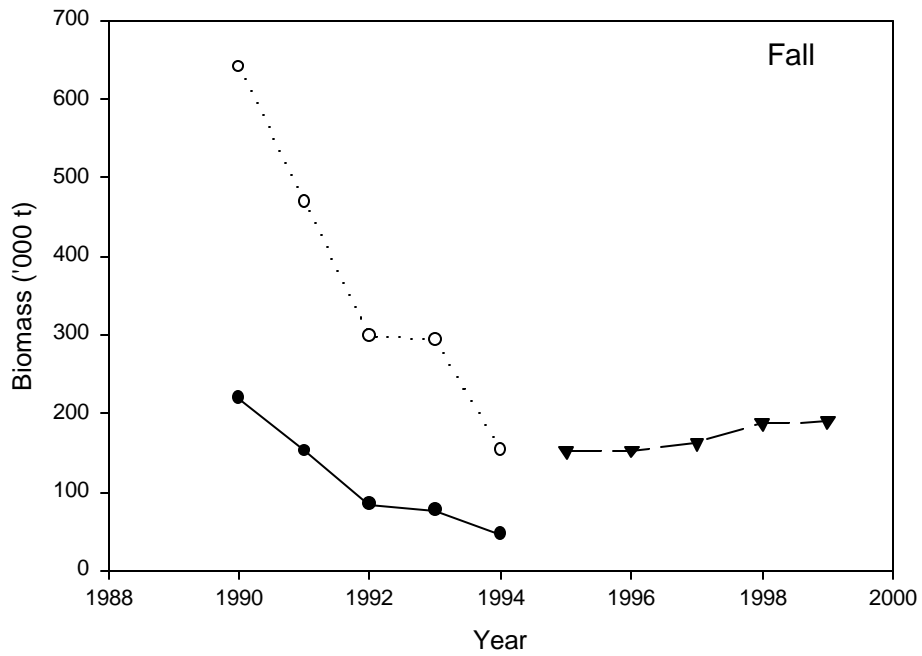
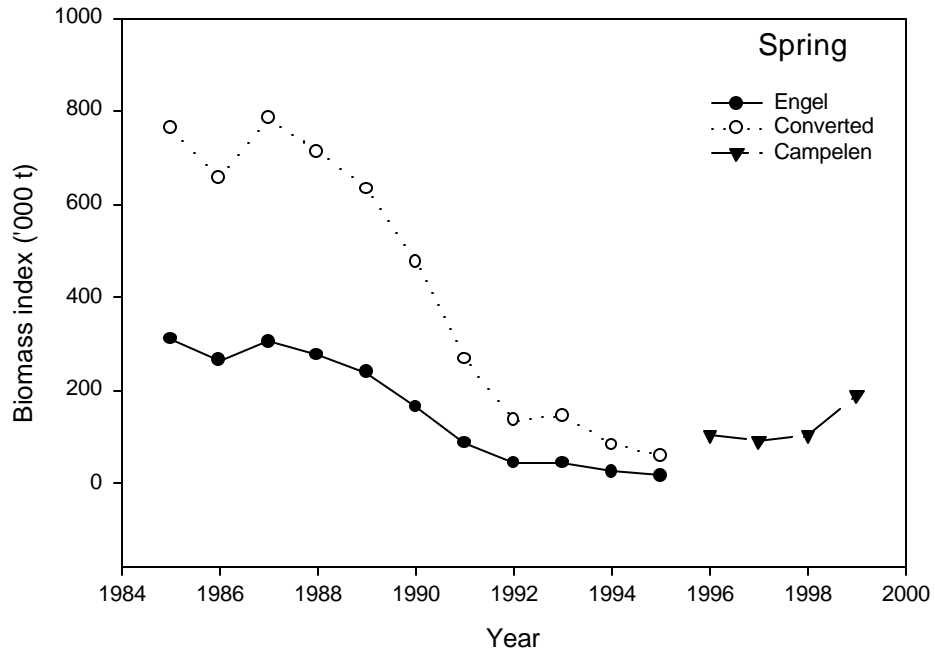


Figure 3. Biomass index for Div. 3LNO American plaice from Canadian spring and fall surveys. Engel data, data converted to Campelen equivalents and Campelen data are shown.

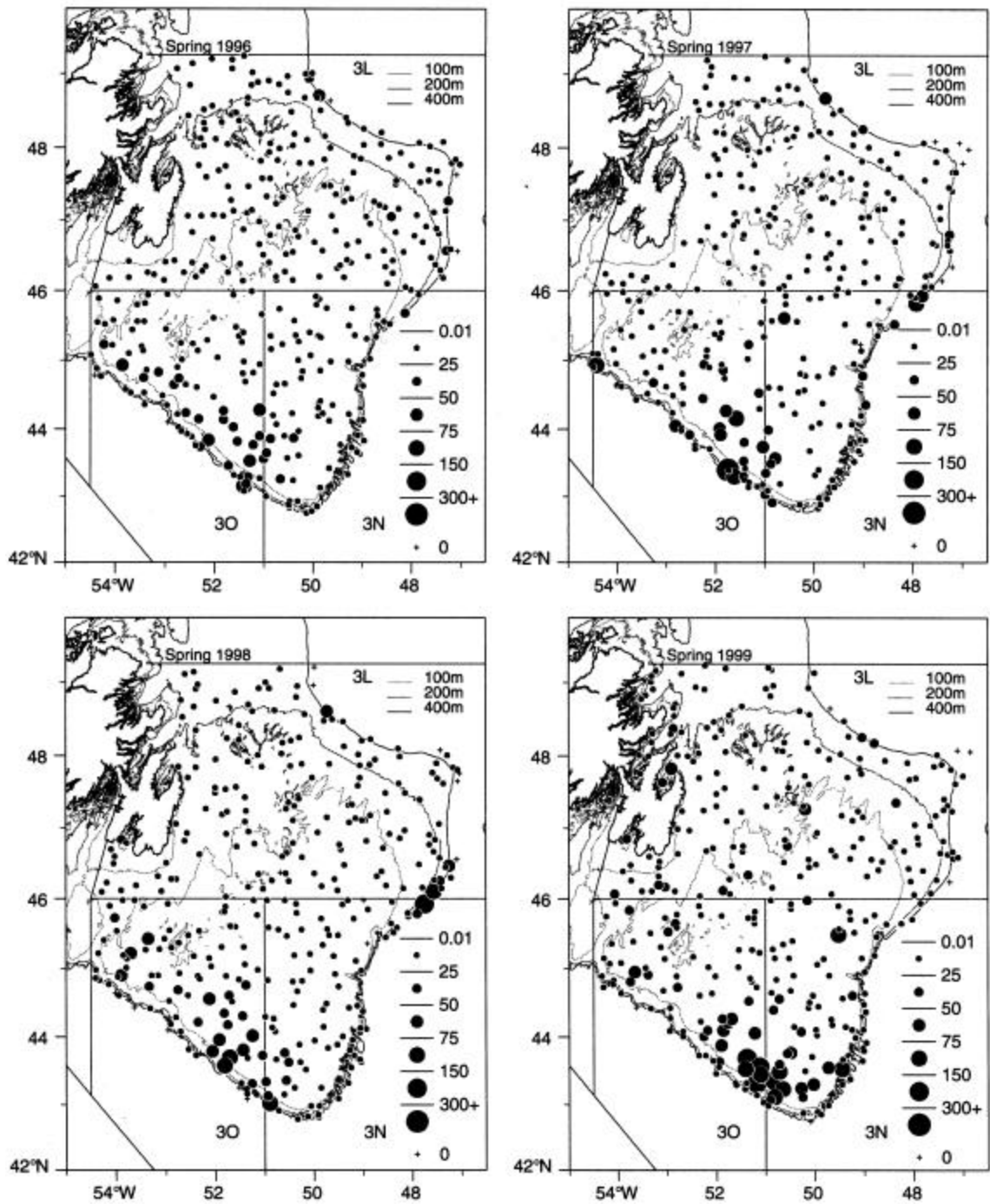


Fig. 4. Distribution of American plaice (kg) from Canadian spring surveys in NAFO Div. 3LNO from 1996-99.

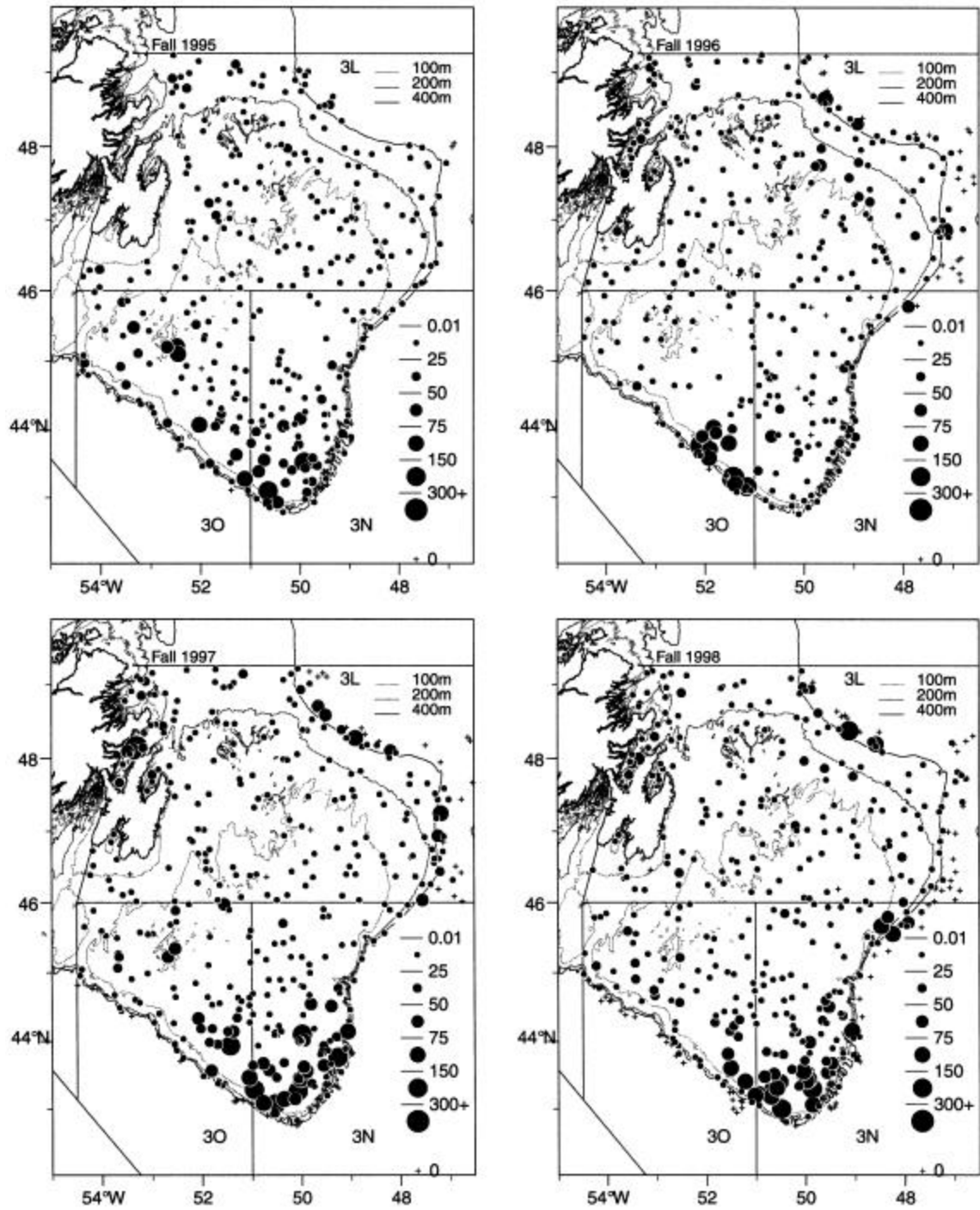


Fig. 5. Distribution of American plaice (kg) from Canadian autumn surveys in NAFO Div. 3LNO from 1995-99.

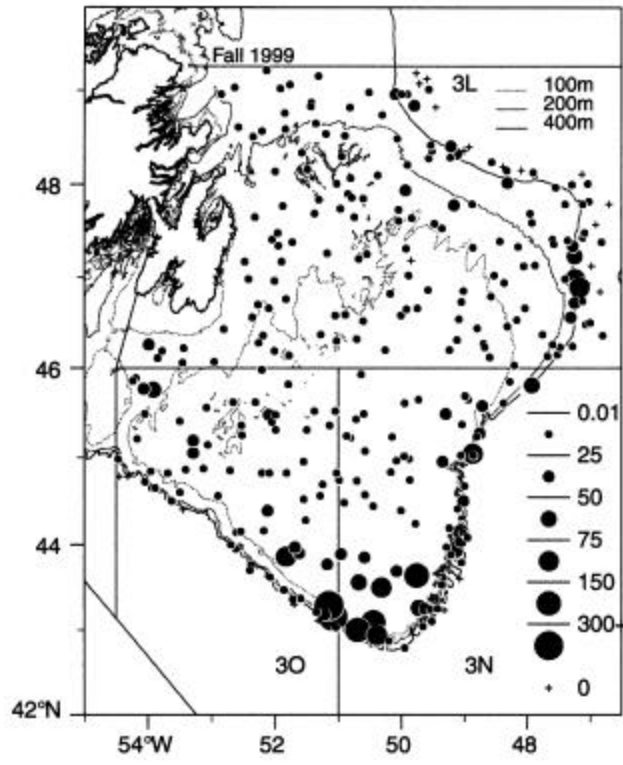


Fig. 5. (continued).