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Assessment of the American Plaice Stock in NAFO Subdiv. 3Ps

by

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ABSTRACT

Catches from this stock in 1992 were the lowest since 1983. Catch rates from Canadian offshore trawlers declined sharply in 1991 and 1992. Recent research vessel surveys by Canada and France showed the stock size to be at its lowest observed level. Analytical models could not be used to determine population sizes in 1992, although fishing mortality is likely to have increased in recent years. This stock is well below historic levels, with no immediate prospects of rebuilding.

RÉSUMÉ

En 1992, les prises de plie canadienne dans la sous-division 3Ps de l'OPANO étaient à leur plus bas depuis 1983. Les taux de prises des chalutiers de pêche hauturière canadiens ont fléchi considérablement en 1991 et 1992. D'après les relevés de recherche récentes des navires scientifiques canadiens et français, le stock a atteint son plus bas niveau de tous les temps. Il n'a pas été possible d'utiliser les modèles analytiques pour déterminer l'ampleur de la population en 1992, mais il est fort probable que la mortalité due à la pêche ait augmenté ces dernières années. Le stock est bien inférieur à ses niveaux antérieurs et rien ne permet de croire qu'il pourra se reconstituer dans l'immédiat.

Introduction

TAC-assessment history

This stock has been under TAC regulation since 1974, when a TAC of 11,000 t was set, based primarily on average catches. The TAC was unchanged at 5000 t from 1980 to 1989 (Table 1, Fig. 1). In 1989, CAFSAC noted that a catch of 3000 t for 1990 would approximate $F_{0.1}$ and the TAC was set subsequently at 4000 t, using the 50% rule. The stock was last examined by CAFSAC in 1991 where it was noted that a catch between 2200 and 3400 t would approximate $F_{0.1}$. The TAC for 1993 was set at 3000 t. Sequential population analysis was attempted for this stock in the most recent assessments; however, the results were generally inconclusive (Brodie 1991).

Catch trends

Catches from this stock were highest from 1968 to 1973, exceeding 12,000 t on three occasions in this period (Table 1, Fig. 1). Catches by foreign vessels peaked at about 8800 t in 1968, due mainly to the USSR catch, and have not exceeded 800 t since 1973. Catches by France ranged from 540 t to 770 t from 1986-90, but declined to only 26 t in 1992.

The Canadian inshore catch in 1992 declined to the lowest level since 1985 (Table 2, Fig. 2). The catch by Canadian offshore trawlers in 1992 was the lowest since 1983, and was about half the level of 1990 and 1991. This fishery has a substantial main species plaice component and is often prosecuted in the first quarter (Table 3-5). Overall, the catch in 1992 was 2300 t, the lowest since 1983, and down 50% from the average of the past 6 years.

Assessment

Catch at age and mean weights at age

The catch at age and mean weights at age for this stock are based on sampling from the Canadian fishery, as no sampling data were available for the French catches. In 1991 and 1992 (Tables 6 & 7), the catch was comprised mainly of fish aged 8-12. This is similar to most years (Table 8), although there are several years, most notably 1981 and 1987, where more old fish appear in the catch matrix. The mean weights at age in 1991 and 1992 were similar to recent values (Table 9).

Catch effort data

A multiplicative analysis of commercial catch rates of American plaice for the Canadian offshore trawler fleet in Subdiv.

3Ps from 1974 to 1992 was conducted. Results from the model are shown in Tables 10 and 11 and Figure 2. The CPUE series shows relative stability from 1974 to 1980, an increase from 1980 to 1983, followed by very large increases in 1984 and 1985. The CPUE was relatively stable from 1987 to 1990, at about the same level observed in 1981-83, then declined sharply to the lowest observed levels in 1991 and 1992. The magnitude of the increase from 1983 to 1984, then 1985, and the subsequent 40% decline to 1986 suggest that the 1985 and possibly the 1984 points are outliers. A previous analysis of the data for 1985 (Brodie 1989) revealed that 85% of the catch by the offshore fleet was taken in March and that virtually all of that catch occurred in one unit area and one depth range, where the CPUE was very much higher than normal.

Research vessel survey data

Stratified-random surveys have been conducted by Canada in Subdiv. 3Ps in each year from 1972 to 1993. Table 12 shows the results from these surveys, and it can be seen that survey coverage was poor in many years prior to 1979. The biomass index (Fig.3) was relatively stable from 1986 to 1988, around 30,000 t, the value from the 1989 survey was substantially lower at 17,000 t, and 4 of the 5 surveys since then have produced estimates less than 7,000 t. The 2 surveys completed in 1993 gave biomass estimates of 2400 and 4600 t. Most of the biomass in recent surveys was in deeper areas than usual but little of the biomass was found beyond 200 fathoms (Table 13).

Age-by-age estimates of abundance from the R. V. surveys are shown in Table 14. A multiplicative model using mean number per stratum was employed. The catch numbers at length for the 1977-82 surveys carried out by the A. T. Cameron were adjusted by the appropriate conversion factors to make them comparable with the data from the 1983 to 1992 surveys. The data for 1977-90 were taken from the last assessment of this stock, which used a multiplicative model to account for strata not surveyed in each year.

Table 14 shows the decline in abundance in this stock in recent years, with 1990 and 1992 the lowest points in the 16-year series. Age-by-age data from the 1993 surveys are not yet available, but the abundance will be lower again based on the biomass estimates.

Data from the French R. V. surveys in 3Ps (D. Briand, IFREMER, St. Pierre, and Miquelon, pers. comm.) also show a decline in abundance (Fig. 4). Both French and Canadian surveys show a peak abundance in the early 1980s, followed by a decline, with recent values in both series being well below historic lows. Age-by-age estimates are not available from the French surveys at this time.

Sequential population analysis (SPA)

SPA was attempted in the 1989 and 1991 assessments of this

stock using various formulations of the adaptive framework with R. V. survey data and C/E at age. The results were not acceptable, due to strong year effects in the residuals and a u-shaped pattern in the slopes of the age relationships. Given these concerns, along with the severe declines in the most recent survey indices, it was concluded that further attempts at SPA would not be useful. In the 1991 assessment, it was felt that there was some useful information available from the SPA. Fs from the converged part of the SPA were related to catches during that period, and compared with catches at a target F of $F_{0.1}$ = 0.25. That assessment indicated that the stock was at a relatively low level and that there had been an increase in F in recent years. Although it was not possible to quantify this increase, a mean catch of about 3750 t from 1974-84 produced a mean F above $F_{0.1}$, and catches from 1985 to 1990 averaged about 4650 t.

Discussion/Prognosis

Similar to other stocks of A. plaice in the Nfld. & Labrador area, 3Ps plaice has declined markedly since the mid to late 1980's and is now at a level well below any observed previously. This is confirmed by all 3 indices (Canadian & French R. V. surveys, and Canadian OT C/E) and by declines in the fishery. Although it has not been possible to quantify fishing mortality precisely, recent assessments suggest that catches have exceeded $F_{0.1}$ levels. It is questionable, however, if catches in the range of 2,500 t to 5,000 t could be solely responsible for declines in abundance of 90% from 1986-88 to the present given the catch history and the biomass levels observed up to 1988. Regardless, the outlook is very pessimistic, given the current stock size, concerns about the spawning stock biomass, and the apparent lack of recruitment in the surveys. In the short term, fisheries can expect a continued downturn, with no immediate prospects for stock rebuilding.

References

Brodie, W.B. 1991. An assessment of the American plaice stock in NAFO Subdivision 3Ps. CAFSAC Research Document 91/72, 30 p.

1989. An assessment of the American plaice stock in NAFO Subdivision 3Ps. CAFSAC Research Document 89/45, 31 p.

Table 1. Catches (1960-92) and TACs (1974-93) of American plaice in NAFO Subdivision 3Ps. All values in metric tons.

Year	Canada			France	USSR	Other	Total	TAC
	Nfld	M&Q	Total					
1960	422	405	827	60	-	-	887	-
1961	764	660	1,424	31	-	-	1,455	-
1962	659	363	1,022	2	-	-	1,024	-
1963	504	25	529	208	1	16	754	-
1964	1,132	230	1,362	152	-	28	1,542	-
1965	574	1,275	1,849	162	-	11	2,022	-
1966	1,162	1,332	2,494	667	218	27	3,406	-
1967	2,201	1,074	3,275	533	678	8	4,494	-
1968	4,007	1,516	5,523	524	8,233	-	14,280	-
1969	2,888	1,178	4,066	245	2,180	-	6,491	-
1970	7,368	4,227	11,595	397	336	-	12,328	-
1971	4,667	1,286	5,953	820	409	-	7,182	-
1972	4,301	1,621	5,922	383	220	13	6,538	-
1973	10,972	1,840	12,812	547	1,368	42	14,769	-
1974	5,887	443	6,330	268	-	-	6,598	11,000
1975	2,517	1,301	3,818	65	128	200	4,211	11,000
1976	5,302	128	5,430	5	9	14	5,458	8,000
1977	4,235	307	4,542	63	-	-	4,605	6,000
1978	3,419	192	3,611	47	-	-	3,658	4,000
1979	3,405	187	3,592	74	-	-	3,666	4,000
1980	2,516	213	2,729	206	-	-	2,935	5,000
1981	2,703	57	2,760	457	-	-	3,217	5,000
1982	1,823	46	1,869	317	-	-	2,186	5,000
1983	1,421	83	1,504	222	-	-	1,726	5,000
1984	2,487	138	2,625	338	-	-	2,963	5,000
1985	3,608	206	3,814	406	-	-	4,220	5,000
1986	4,367	98	4,465	665	-	-	5,130	5,000
1987	4,669	119	4,788	543	-	-	5,331	5,000
1988	3,745	56	3,801	605	-	-	4,406	5,000
1989	3,102	96	3,198	759	-	-	3,957	5,000
1990[a]	3,880	226	4,106	739	-	-	4,845	4,000
1991[a]	3,982	76	4,058	337			4,395	4,000
1992[a]	2,305	-	2,305	26			2,331	4,000
1993								3,000

[a]Provisional

Table 2. Catches by Canadian vessels, 3Ps American plaice, 1972-92.

Year	Gear							
	Seine	Gillnet	Longline	Other	Subtotal	Ottertrawl	Unk.	Total
1972	11	174	143	7	335	5,587		5,922
1973	63	233	212	17	525	12,287		12,812
1974	3	195	235	20	453	5,877		6,330
1975	62	322	127	63	574	3,244		3,818
1976	28	245	44	13	330	5,100		5,430
1977	140	291	119	17	567	3,975		4,542
1978	65	256	185	29	535	3,076		3,611
1979	117	292	176	13	598	2,994		3,592
1980	17	373	266	15	671	2,058		2,729
1981	84	671	370	19	1,144	1,616		2,760
1982	35	265	199	4	503	1,366		1,869
1983	9	113	219	9	350	1,154		1,504
1984	-	86	102	15	203	2,422		2,625
1985	2	118	273	6	399	3,415		3,814
1986	10	887	354	12	1,262	3,203		4,465
1987	20	1,650	300	50	2,020	2,768		4,788
1988	9	1,089	225	21	1,344	2,457		3,801
1989	-	1,071	190	30	1,291	1,892		3,198
1990[a]	12	737	285	19	1,053	3,050		4,106
1991[a]	8	977	189	14	1,188	2,794	76	4,058
1992[a]	11	587	133	15	746	1,559		2,305

[a]Provisional.

Table 3. Nominal catch by month, American plaice in Subdivision 3Ps, 1972-92.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	UNK	Total
1972	1,118	105	311	161	110	109	391	520	604	880	1,044	1,185	-	6,538
1973	1,681	500	2,599	1,527	96	350	969	2,607	931	504	2,237	768	-	14,769
1974	162	133	1,576	2,575	123	137	165	399	567	128	364	269	-	6,598
1975	6	6	1,495	616	332	280	186	115	120	82	441	532	-	4,211
1976	98	254	461	191	91	284	439	512	353	433	984	1,358	-	5,458
1977	28	547	663	339	309	287	414	204	105	261	712	736	-	4,605
1978	250	141	185	1,066	853	121	433	427	40	41	55	46	-	3,658
1979	467	376	1086	212	189	262	225	265	124	161	246	53	-	3,666
1980	14	464	180	63	216	359	166	170	170	191	256	686	-	2,935
1981	423	57	236	371	363	331	302	156	214	263	273	228	-	3,217
1982	53	4	285	315	181	156	133	195	125	95	463	181	-	2,186
1983	98	47	161	71	61	155	169	91	327	372	149	25	-	1,726
1984	128	1,933	101	43	125	126	85	60	31	194	94	43	-	2,963
1985	3	55	2,814	240	35	154	134	80	199	146	343	17	-	4,220
1986	1,960	447	500	52	149	334	444	493	302	275	91	83	-	5,130
1987	455	260	1,312	349	241	512	711	581	200	189	250	271	-	5,331
1988	236	714	389	73	130	509	805	363	342	263	341	241	-	4,406
1989	118	273	509	269	234	547	737	336	220	252	301	161	-	3,957
1990[a]	287	397	1,653	260	138	334	307	416	207	63	7	34	742	4,845
1991[a]	38	457	466	202	330	561	629	507	422	506	86	115	76	4,395
1992[a]	356	432	213	262	111	229	245	154	99	161	27	16	26	2,331

[a]Provisional.

Table 4. Catch of A. plaice in Subdiv. 3Ps in 1991.

	Canada							
	OT	Seine	GN	LL	Other	UNK	France	Total
Jan	37						1	38
Feb	443						14	457
Mar	442	3					21	466
Apr	188		6				8	202
May	233		80	2			15	330
Jun	348		184	8	1		20	561
Jul	214		342	60	3		10	629
Aug	201		254	49	3			507
Sep	292	1	83	41	4		1	422
Oct	266	2	28	21	2		187	506
Nov	48	2		6	1		29	86
Dec	82			2			31	115
Unk						76		76
Total	2794	8	977	189	14	76	337	4395

Table 5. Catch of A. plaice in Subdiv. 3Ps in 1992.

	Canada						
	OT	Seine	GN	LL	Other	France	Total
Jan	352	3		1			356
Feb	427	5					432
Mar	211	2					213
Apr	260	1	1				262
May	73		36	2			111
Jun	38		183	7	1		229
Jul	15		205	21	4		245
Aug	9		115	25	5		154
Sep	17		33	46	3		99
Oct	129		12	18	2		161
Nov	17		1	9			27
Dec	11		1	4			16
Unk						26	26
Total	1559	11	587	133	15	26	2331

Table 6. Catch at age (000) and mean weights at age (kg) of A.plaice from the commercial fishery in Subdiv. 3Ps in 1991.

	AVERAGE		CATCH		
AGE	WEIGHT	LENGTH	MEAN	STD. ERR.	C. V.
* 6	0.279	31.729	26	9.99	0.39
7	0.299	32.405	181	27.15	0.15
* 8	0.390	35.084	852	66.06	0.08
9	0.531	38.479	1444	92.70	0.06
10	0.687	41.625	1305	92.55	0.07
11	0.892	45.038	846	72.44	0.09
12	1.178	48.995	583	52.61	0.09
*13	1.534	53.104	239	28.56	0.12
*14	1.960	57.169	155	20.93	0.14
15	2.253	59.576	68	10.55	0.16
16	2.809	63.698	22	5.27	0.24
*17	3.596	68.643	4	0.78	0.20
*18	3.216	66.500		0.00	0.01

Table 7. Catch at age (000) and mean weights at age (kg) of A.plaice from the commercial fishery in Subdiv. 3Ps in 1992.

	AVERAGE		CATCH		
AGE	WEIGHT	LENGTH	MEAN	STD. ERR.	C. V.
5	0.192	28.500	1	1.29	1.11
* 6	0.303	32.229	2	1.29	0.72
* 7	0.323	33.154	44	12.10	0.27
* 8	0.379	34.784	233	27.46	0.12
9	0.489	37.529	665	44.08	0.07
10	0.641	40.756	660	44.35	0.07
11	0.873	44.794	401	33.82	0.08
12	1.114	48.188	265	24.02	0.09
13	1.421	51.948	155	15.77	0.10
14	1.761	55.410	111	13.62	0.12
15	2.036	57.883	70	10.90	0.16
*16	2.618	62.408	56	10.11	0.18
17	3.002	65.053	22	7.11	0.33
18	3.376	67.441	15	4.83	0.33
19	3.549	68.500	1	0.75	1.15
*20	4.286	72.500	2	0.03	0.02

Table 8. Catch at age (000), 3Ps A. plaice.

AGE	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
6	326	391	121	18	49	130	2	8	2	5	4	3	3	5	13	10	30	26	2
7	903	839	445	133	196	240	121	89	28	83	14	28	90	90	181	195	232	181	44
8	889	721	1117	330	482	574	491	434	186	401	107	378	357	277	842	563	743	852	233
9	1140	644	1514	803	964	908	737	1032	377	476	603	995	613	349	1167	570	884	1444	665
10	1263	383	1266	905	1011	820	725	670	774	670	1151	1214	949	521	1164	667	923	1305	660
11	717	423	979	952	756	608	600	466	1103	501	1203	1008	1133	621	958	703	746	846	401
12	792	490	715	343	726	349	545	291	447	328	656	579	917	834	651	532	543	583	265
13	801	361	460	288	324	225	364	297	191	256	351	290	397	681	321	451	347	239	155
14	422	258	223	245	225	149	71	369	121	89	230	193	335	580	197	320	251	155	111
15	186	61	162	223	123	117	81	341	43	15	110	130	175	396	132	173	216	68	70
16	198	91	127	235	75	43	50	143	21	12	42	68	72	195	47	58	86	22	56
17	132	79	50	157	20	23	23	104	12	3	12	45	21	95	14	9	12	4	22
18	137	51	41	102	11	3	14	38	5	1	6	17	7	53	1	1	2	1	15
19	57	44	2	34	6	1	1	20	1	1	1	4	1	1	1	1	1	0	1

Table 9. Mean weights at age (kg), 3Ps A. plaice.

AGE	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
6	0.276	0.277	0.285	0.250	0.295	0.348	0.151	0.283	0.288	0.271
7	0.343	0.381	0.335	0.301	0.306	0.428	0.316	0.301	0.405	0.396
8	0.414	0.515	0.419	0.330	0.370	0.453	0.372	0.362	0.400	0.438
9	0.516	0.561	0.522	0.415	0.469	0.560	0.469	0.433	0.428	0.534
10	0.685	0.760	0.626	0.620	0.551	0.731	0.547	0.604	0.491	0.645
11	0.855	0.852	0.797	0.747	0.783	0.989	0.756	0.756	0.629	0.686
12	1.109	1.220	0.998	1.011	0.940	1.290	0.938	0.922	0.890	0.824
13	1.377	1.368	1.238	1.362	1.105	1.729	1.313	0.862	1.143	0.913
14	1.790	1.621	1.474	1.560	1.197	2.084	2.025	0.958	1.492	1.458
15	2.004	1.997	1.682	1.779	1.716	2.320	2.037	1.164	1.919	1.866
16	2.540	2.334	1.981	2.010	2.409	2.902	2.453	1.619	2.273	2.348
17	2.530	2.613	2.367	2.294	2.624	3.124	2.898	1.849	2.665	2.781
18	3.163	2.963	2.932	2.662	2.662	2.902	3.103	2.204	3.244	3.640
19	3.740	2.890	3.352	3.159	4.021	3.124	3.103	2.633	3.568	4.687

AGE	1984	1985	1986	1987	1988	1989	1990	1991	1992
6	0.263	0.192	0.278	0.235	0.281	0.242	0.285	0.279	0.303
7	0.288	0.259	0.346	0.320	0.303	0.308	0.345	0.299	0.323
8	0.340	0.341	0.427	0.400	0.382	0.392	0.419	0.390	0.379
9	0.401	0.462	0.533	0.513	0.494	0.562	0.551	0.531	0.489
10	0.492	0.620	0.673	0.623	0.648	0.692	0.663	0.687	0.641
11	0.612	0.851	0.819	0.738	0.818	0.863	0.894	0.892	0.873
12	0.809	1.172	1.113	0.938	1.082	1.114	1.220	1.178	1.114
13	1.036	1.475	1.407	1.168	1.325	1.362	1.604	1.534	1.421
14	1.270	1.850	1.805	1.497	1.627	1.780	2.077	1.960	1.761
15	1.712	2.289	2.252	1.901	2.064	2.254	2.635	2.253	2.036
16	2.355	2.665	2.762	2.450	2.603	3.078	3.300	2.809	2.618
17	2.538	3.139	3.478	3.107	3.313	3.504	4.160	3.596	3.002
18	3.034	3.366	3.772	3.511	4.148	4.489	5.124	3.216	3.376
19	3.212	3.545	5.118	4.116	0.000	0.000	0.000	0.000	3.549

MULTIPLE R..... 0.769
MULTIPLE R SQUARED..... 0.592

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SUMS OF SQUARES	MEAN SQUARES	F-VALUE
INTERCEPT	1	3.368E1	3.368E1	
REGRESSION	32	5.235E0	1.636E-1	13.049
TYPE 1	3	2.288E-1	7.627E-2	6.084
TYPE 2	11	1.265E0	1.150E-1	9.172
TYPE 3	18	2.400E0	1.333E-1	10.634
RESIDUALS	288	3.610E0	1.254E-2	
TOTAL	321	4.253E1		

Type 1 = Country/Gear/Tonnage Class
Type 2 = Month
Type 3 = Year

Country/Gear/TC codes:
2125=Canada(M), Stern trawl, TC 5
3114=Canada(N), Side trawl, TC 4
3124=Canada(N), Stern trawl, TC 4
3125=Canada(N), Stern trawl, TC 5

REGRESSION COEFFICIENTS

CATEGORY	CODE	VARIABLE	COEFFICIENT	STD. ERROR	NO. OBS.
1	3125	INTERCEPT	-0.782	0.092	321
3	3				
4	74				
1	2125	1	0.120	0.100	22
	3114	2	-0.230	0.061	55
	3124	3	-0.086	0.055	70
3	1	4	-0.166	0.092	23
	2	5	-0.131	0.087	28
	4	6	-0.376	0.080	38
	5	7	-0.725	0.097	21
	6	8	-0.335	0.104	21
	7	9	0.106	0.101	20
	8	10	-0.028	0.098	24
	9	11	-0.366	0.098	21
	10	12	-0.442	0.091	31
	11	13	-0.270	0.086	29
	12	14	-0.261	0.088	27
4	75	15	0.033	0.109	18
	76	16	-0.174	0.097	26
	77	17	-0.084	0.100	26
	78	18	-0.093	0.106	22
	79	19	0.043	0.101	27
	80	20	-0.107	0.111	21
	81	21	0.116	0.112	19
	82	22	0.316	0.116	16
	83	23	0.193	0.126	14
	84	24	0.555	0.160	8
	85	25	0.889	0.147	8
	86	26	0.431	0.132	11
	87	27	0.191	0.116	16
	88	28	0.204	0.111	17
	89	29	0.108	0.124	11
	90	30	0.239	0.137	9
	91	31	-0.471	0.117	12
	92	32	-0.690	0.128	12

Table 11. Catch rate series from multiplicative analysis, 3Ps A.plaice.

PREDICTED CATCH RATE

YEAR	LN TRANSFORM MEAN	LN TRANSFORM S.E.	RETRANSFORMED MEAN	RETRANSFORMED S.E.	CATCH	EFFORT
1974	-0.7823	0.0085	0.458	0.042	6598	14397
1975	-0.7494	0.0104	0.473	0.048	4211	8900
1976	-0.9564	0.0079	0.385	0.034	5458	14171
1977	-0.8660	0.0082	0.422	0.038	4605	10923
1978	-0.8754	0.0092	0.417	0.040	3658	8764
1979	-0.7397	0.0081	0.478	0.043	3666	7664
1980	-0.8894	0.0108	0.411	0.043	2935	7137
1981	-0.6662	0.0110	0.514	0.054	3217	6258
1982	-0.4662	0.0118	0.628	0.068	2186	3483
1983	-0.5894	0.0146	0.554	0.067	1726	3115
1984	-0.2270	0.0232	0.793	0.120	2963	3738
1985	0.1065	0.0174	1.110	0.146	4220	3803
1986	-0.3517	0.0146	0.703	0.085	5130	7300
1987	-0.5916	0.0110	0.554	0.058	5331	9625
1988	-0.5783	0.0104	0.561	0.057	4406	7848
1989	-0.6740	0.0126	0.510	0.057	3957	7764
1990	-0.5434	0.0154	0.580	0.072	4845	8354
1991	-1.2530	0.0110	0.286	0.030	4395	15374
1992	-1.4725	0.0134	0.229	0.027	2331	10168

Table 12 Mean weight (kg) of American plaice per tow, by stratum, from r.v. surveys in Subdivision 3Ps. Numbers in parentheses are the number of successful 30-minute tows in each stratum. The stratified mean weight per tow and the biomass estimates are given at the bottom of the table. (ATC, AN, WT, refers to the research vessels, A.T. CAMERON, A. NEEDLER, and W. TEMPLEMAN respectively.)

Depth (fm)	Stratum	No. of trawl units ('000)	Year - Survey 1972 ATC 197	1973 ATC 207	1974 ATC 221	1975 ATC 234	1976 ATC 247	1977 ATC 261	1978 ATC 275	1979 ATC 287	1980 ATC 302	1981 ATC 316	1982 ATC 330
101-150	306	31.452	-	-	0.3(6)	0.4(4)	0.6(2)	0.5(6)	1.0(6)	1.4(5)	1.1(2)	0.6(3)	0.5(3)
51-100	307	29.650	0.0(3)	0.0(5)	1.9(7)	0.4(4)	1.4(4)	1.1(4)	0.1(4)	0.1(4)	1.6(2)	0.9(3)	2.5(4)
31- 50	308	8.407	-	0.7(2)	28.1(2)	17.3(4)	16.3(2)	18.8(4)	-	0.7(4)	4.0(2)	306.5(2)	49.3(2)
101-150	309	22.219	0.0(2)	1.2(3)	0.1(4)	2.6(6)	0.5(3)	1.1(6)	1.3(6)	3.9(6)	0.7(2)	1.5(2)	0.4(2)
101-150	310	12.761	-	-	0.2(3)	1.5(6)	-	0.3(6)	0.5(6)	1.7(6)	3.0(2)	3.0(2)	1.0(3)
51-100	311	23.795	8.1(4)	109.1(9)	13.4(8)	8.8(4)	12.6(6)	3.9(4)	5.9(4)	40.4(4)	108.5(2)	10.0(2)	2.7(3)
31- 50	312	20.417	249.5(2)	-	43.3(2)	18.4(3)	20.6(5)	12.5(4)	-	0.1(3)	-	1.2(2)	5.3(2)
101-150	313	12.386	0.5(2)	168.3(2)	0.7(5)	0.4(3)	1.2(3)	0.5(10)	4.1(2)	4.0(5)	2.6(2)	21.5(2)	1.2(2)
0- 30	314	73.113	28.6(2)	-	0.2(2)	-	1.1(2)	16.3(4)	-	-	0.5(2)	0.3(5)	23.3(5)
31- 50	315	62.078	71.7(2)	48.3(2)	103.0(2)	-	32.7(2)	27.2(4)	-	5.3(3)	48.1(4)	33.0(2)	53.5(3)
101-150	316	14.187	3.2(2)	23.0(3)	0.4(6)	-	0.8(4)	3.7(6)	4.0(6)	12.0(3)	7.5(2)	18.9(2)	-
51-100	317	14.487	64.9(4)	161.7(7)	30.2(8)	9.9(4)	5.1(4)	1.4(4)	51.3(4)	249.6(3)	318.4(2)	56.0(2)	34.2(3)
101-150	318	9.233	-	134.3(2)	1.8(2)	0.0(4)	1.9(2)	0.7(6)	10.9(2)	3.9(2)	8.9(2)	-	0.3(2)
51-100	319	73.863	14.0(4)	15.6(5)	61.2(2)	11.8(4)	63.0(4)	48.6(6)	34.2(4)	8.1(2)	39.3(4)	79.5(2)	33.0(7)
0- 30	320	99.085	-	2.7(2)	-	-	11.2(3)	-	-	-	12.3(6)	7.0(2)	18.8(4)
31- 50	321	89.251	90.5(2)	3.4(2)	-	-	88.5(2)	-	-	-	30.5(5)	45.5(2)	27.3(4)
51-100	322	117.626	-	-	-	-	75.1(4)	-	-	2.8(2)	67.1(8)	21.5(2)	58.0(8)
51-100	323	52.245	222.6(3)	-	-	-	111.0(4)	34.5(2)	-	-	162.5(3)	108.5(2)	256.5(2)
51-100	324	37.082	-	-	-	-	53.6(2)	-	-	4.0(2)	26.8(2)	-	71.3(2)
31- 50	325	70.861	-	-	-	-	60.4(2)	-	-	2.7(2)	7.7(4)	4.6(2)	41.4(5)
31- 50	326	12.461	-	-	-	-	-	-	-	15.7(2)	13.9(2)	1.9(2)	44.3(2)
151-200	705	14.638	0.9(2)	1.4(2)	0.8(4)	0.3(2)	2.2(2)	1.1(4)	0.2(3)	2.8(4)	0.5(2)	0.9(2)	0.6(2)
151-200	706	35.731	4.4(2)	8.2(2)	2.2(7)	-	-	3.1(4)	1.6(2)	5.6(3)	1.4(2)	6.8(2)	0.6(4)
151-200	707	6.981	14.9(2)	-	0.0(2)	0.4(4)	0.1(2)	0.1(4)	3.6(2)	2.1(2)	4.5(2)	-	-
201-300	708	8.783	-	-	-	0.0(3)	-	0.2(4)	-	0.5(2)	0.6(2)	-	-
301-400	709	7.206	-	-	-	-	-	-	-	-	-	-	-
301-400	710	2.702	-	-	-	-	-	-	-	-	-	-	-
201-300	711	72.137	-	-	-	-	-	-	-	-	0.2(2)	0.7(2)	0.0(2)
201-300	712	73.037	-	-	-	-	-	-	-	1.4(2)	0.0(2)	0.2(2)	0.0(3)
201-300	713	71.311	-	-	-	0.6(3)	-	-	-	-	0.2(2)	0.9(6)	0.3(2)
201-300	714	89.702	-	-	-	-	-	-	-	-	1.0(2)	0.1(8)	0.0(6)
151-200	715	9.908	0.0(2)	-	0.0(4)	0.0(2)	0.2(2)	0.2(4)	0.3(4)	0.4(3)	0.5(2)	0.3(2)	0.2(2)
151-200	716	40.460	0.0(2)	-	0.1(3)	-	-	0.9(6)	0.4(4)	2.1(4)	0.5(2)	1.8(4)	0.4(2)
Mean (No. sets)			56.8(42)	26.8(48)	25.2(79)	5.1(60)	42.3(66)	15.8(102)	8.6(61)	9.5(78)	27.8(80)	21.0(80)	30.7(91)
Biomass (t) from surveyed strata			33,826	13,654	12,999	1,901	37,757	9,109	3,785	7,236	35,776	25,974	39,076

Table 12 (Cont'd.)

Depth (fm)	Stratum	Year - Survey 1983 AN 9	1984 AN 26	1985 WT 26	1986 WT 45	1987 WT 55,56	1988 WT 68	1989 WT 81	1990 WT 91	1991 WT 103	1992 WT 118	1993 (Feb) WT 133	1993 (Apr) WT 135*
101-150	306	0.2(4)	0.1(2)	2.7(2)	0.6(3)	0.2(4)	0.3(4)	0.8(3)	0.1(3)	0.0(4)	0.3(2)	0.1(4)	0.2(4)
51-100	307	1.3(4)	0.0(2)	0.1(3)	1.0(3)	0.4(3)	0.9(4)	0.1(3)	0.2(3)	0.0(3)	0.9(2)	0.1(4)	0.5(3)
31- 50	308	101.2(3)	1.5(2)	3.7(2)	0.0(2)	0.0(2)	0.5(2)	0.0(2)	0.0(2)	0.0(2)	0.5(2)	0.0(2)	0.6(2)
101-150	309	0.3(3)	7.3(2)	1.6(3)	0.2(2)	0.5(2)	1.1(3)	0.1(2)	1.2(2)	0.9(3)	1.3(2)	0.8(3)	0.7(2)
101-150	310	0.2(3)	0.5(2)	4.2(3)	2.0(2)	3.5(2)	5.7(3)	10.3(2)	14.8(2)	3.6(2)	2.7(2)	2.6(2)	3.1(2)
51-100	311	2.0(3)	2.6(2)	16.2(4)	77.0(3)	27.0(2)	74.1(4)	3.4(3)	15.2(3)	3.8(3)	0.2(2)	1.9(3)	3.9(2)
31- 50	312	12.2(3)	0.6(2)	1.5(2)	4.0(2)	2.8(2)	0.0(2)	1.5(3)	6.9(3)	0.2(2)	5.4(2)	0.0(2)	2.1(2)
101-150	313	2.9(3)	0.7(2)	0.9(2)	9.7(2)	1.6(2)	8.5(2)	9.3(2)	71.8(2)	52.4(2)	25.4(2)	2.8(2)	13.6(2)
0- 30	314	11.9(7)	5.3(4)	0.5(7)	2.0(8)	6.0(5)	0.0(7)	0.9(9)	0.1(6)	2.4(7)	0.2(5)	0.0(6)	0.2(7)
31- 50	315	61.4(8)	35.3(5)	40.9(7)	62.5(6)	33.1(8)	39.5(6)	14.6(7)	1.2(2)	9.4(7)	2.7(7)	0.4(5)	8.1(5)
101-150	316	5.3(4)	1.7(2)	3.8(3)	7.0(2)	196.8(3)	19.8(3)	25.1(3)	8.2(2)	163.1(2)	188.9(2)	-	17.6(3)
51-100	317	52.0(3)	6.0(2)	1312.8(2)	29.3(2)	80.0(3)	62.5(2)	151.8(2)	71.3(2)	8.7(2)	32.4(2)	12.0(2)	4.7(2)
101-150	318	3.6(3)	7.3(2)	-	7.0(2)	37.1(2)	70.0(2)	2.0(2)	-	71.2(2)	53.0(2)	12.6(2)	47.0(2)
51-100	319	112.1(7)	43.3(6)	26.5(2)	27.1(8)	104.3(9)	8.9(8)	33.7(8)	-	54.5(9)	10.9(10)	3.9(9)	6.9(6)
0- 30	320	34.0(14)	9.4(8)	38.3(5)	17.0(9)	7.0(11)	4.5(11)	2.6(10)	1.4(5)	0.9(12)	1.1(9)	1.3(5)	6.6(8)
31- 50	321	47.2(10)	28.0(6)	23.1(7)	26.9(10)	21.8(10)	5.7(11)	53.7(9)	1.7(8)	1.0(11)	0.8(9)	0.4(6)	1.9(8)
51-100	322	71.2(11)	64.3(8)	179.2(13)	55.5(12)	22.9(10)	9.4(12)	5.2(14)	2.2(16)	7.7(14)	0.3(8)	0.2(12)	0.8(12)
51-100	323	125.7(6)	44.4(4)	68.0(3)	170.5(5)	164.8(6)	324.0(5)	52.6(7)	19.1(4)	10.1(6)	1.6(6)	0.7(7)	0.7(4)
51-100	324	91.5(4)	15.5(3)	202.3(2)	7.5(5)	95.7(4)	0.3(4)	11.5(5)	8.5(5)	8.5(4)	0.2(5)	0.0(3)	0.8(4)
31- 50	325	53.4(8)	27.0(5)	25.7(3)	6.5(8)	1.6(6)	2.6(6)	6.1(8)	0.3(2)	1.8(9)	0.3(10)	0.2(9)	0.1(6)
31- 50	326	40.8(3)	29.8(2)	-	8.0(2)	14.3(2)	0.6(2)	36.7(2)	1.1(2)	0.2(2)	0.8(2)	0.2(2)	0.0(2)
151-200	705	0.5(3)	0.4(2)	3.5(2)	2.2(2)	3.5(2)	6.5(2)	13.0(2)	1.8(2)	1.7(2)	5.6(2)	4.4(2)	2.7(2)
151-200	706	1.9(5)	0.3(2)	1.8(4)	7.3(4)	9.7(5)	3.4(4)	3.3(4)	9.0(4)	5.3(4)	7.6(5)	9.2(3)	25.7(5)
151-200	707	0.0(3)	8.1(2)	-	4.0(2)	1.0(2)	5.2(2)	0.1(2)	-	39.8(2)	23.2(2)	8.7(2)	23.0(2)
201-300	708	0.2(2)	1.4(2)	-	3.6(2)	1.5(2)	0.0(2)	3.0(2)	-	21.8(2)	6.3(2)	18.29(0)	5.2(2)
301-400	709	0.2(2)	0.0(2)	-	-	-	-	7.0(2)	-	4.0(2)	-	4.0(2)	3.7(2)
301-400	710	0.0(3)	2.5(2)	1.3(2)	0.7(2)	-	18.0(2)	-	-	9.2(2)	-	57.1(2)	0.0(2)
201-300	711	0.8(8)	0.9(5)	1.0(8)	1.4(9)	2.2(7)	3.3(7)	1.7(7)	1.1(3)	1.9(8)	2.6(10)	0.9(5)	1.0(5)
201-300	712	0.9(7)	-	1.0(6)	0.4(9)	0.3(4)	1.9(7)	1.9(8)	4.9(5)	0.6(8)	1.4(10)	1.5(7)	0.3(7)
201-300	713	0.4(7)	-	0.4(8)	0.1(5)	1.0(4)	1.1(7)	1.2(8)	0.2(7)	4.5(8)	2.4(10)	1.8(8)	0.3(6)
201-300	714	0.3(10)	-	-	8.8(5)	0.5(4)	1.8(9)	0.8(10)	0.8(7)	1.0(11)	0.7(7)	0.1(11)	0.1(9)
151-200	715	0.8(3)	0.0(2)	-	1.8(2)	0.4(2)	0.0(2)	0.1(2)	2.3(2)	0.1(2)	0.5(2)	0.1(2)	1.1(4)
151-200	716	1.5(4)	0.2(3)	4.2(5)	1.8(4)	3.8(3)	6.6(5)	1.5(4)	4.9(5)	1.3(5)	6.1(3)	7.7(4)	1.9(4)
Mean (No. sets)		34.7(171)	20.8(95)	54.9(110)	23.2(144)	25.9(134)	20.8(152)	12.9(157)	4.8(109)	9.2(164)	5.2(147)	1.8(141)	3.4(138)
Biomass (t) from surveyed strata		45,200	22,549	64,494	30,450	33,923	27,326	17,004	5,835	12,119	6,838	2,407	4,542

*Preliminary analysis

Table 13 Biomass (tons) by stratum of A. plaice from research vessel surveys in Subdivision 3Ps from 1972-93.

Depth (fath)	Stratum	Units ('000)	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
0- 30	314	73	2091	0	15	0	80	1192	0	0	37	22	1704
	320	99	0	268	0	0	1110	0	0	0	1219	694	1863
31- 50	308	8	0	6	236	145	137	158	0	6	34	2577	414
	312	20	5094	0	884	376	421	255	0	2	0	25	108
	315	62	4451	2998	6394	0	2030	1689	0	329	2986	2049	3321
	321	89	8077	303	0	0	7899	0	0	0	2722	4061	2437
	325	71	0	0	0	0	4280	0	0	191	546	326	2934
	326	12	0	0	0	0	0	0	0	196	173	24	552
51-100	307	30	0	0	56	12	42	33	3	3	47	27	74
	311	24	193	2596	319	209	300	93	140	961	2582	238	64
	317	14	940	2343	438	143	74	20	743	3616	4613	811	495
	319	74	1034	1152	4520	872	4653	3590	2526	598	2903	5872	2437
	322	118	0	0	0	0	8834	0	0	329	7893	2529	6822
	323	52	11630	0	0	0	5799	1802	0	0	8490	5669	13401
	324	37	0	0	0	0	1988	0	0	148	994	0	2644
101-150	306	31	0	0	9	13	19	16	31	44	35	19	16
	309	22	0	27	2	58	11	24	29	87	16	33	9
	310	13	0	0	3	19	0	4	6	22	38	38	13
	313	12	6	2085	9	5	15	6	51	50	32	266	15
	316	14	45	326	6	0	11	52	57	170	106	268	0
	318	9	0	1240	17	0	18	6	101	36	82	0	3
151-200	705	15	13	20	12	4	32	16	3	41	7	13	9
	706	36	157	293	79	0	0	111	57	200	50	243	21
	707	7	104	0	0	3	1	1	25	15	31	0	0
	715	10	0	0	0	0	2	2	3	4	5	3	2
	716	40	0	0	4	0	0	36	16	85	20	73	16
201-300	708	9	0	0	0	0	0	2	0	4	5	0	0
	711	72	0	0	0	0	0	0	0	0	14	50	0
	712	73	0	0	0	0	0	0	0	102	0	15	0
	713	71	0	0	0	43	0	0	0	0	14	64	21
	714	90	0	0	0	0	0	0	0	0	90	9	0
301-400	709	7	0	0	0	0	0	0	0	0	0	0	0
	710	3	0	0	0	0	0	0	0	0	0	0	0
Biomass			33836	13657	13002	1902	37754	9108	3792	7240	35784	26017	39396
0-30			2091	268	15	0	1190	1192	0	0	1255	716	3566
31-50			17622	3308	7514	521	14766	2102	0	724	6461	9060	9766
51-100			13797	6091	5333	1236	21689	5538	3413	5656	27521	15146	25938
101-150			52	3678	45	94	74	109	275	408	309	625	55
151-200			274	313	94	7	35	166	104	345	114	332	48
201-300			0	0	0	43	0	2	0	107	124	138	21
301-400			0	0	0	0	0	0	0	0	0	0	0

Table 13. Continued.

1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 Feb	1993 April
870	387	37	146	439	0	66	7	175	15	0	15
3369	931	3795	1684	694	446	258	139	89	109	129	654
851	13	31	0	0	4	0	0	0	4	0	5
249	12	31	82	57	0	31	141	4	110	0	43
3812	2191	2539	3880	2055	2452	906	74	584	168	25	503
4213	2499	2062	2401	1946	509	4793	152	89	71	36	170
3784	1913	1821	461	113	184	432	21	128	21	14	7
508	371	0	100	178	7	457	14	2	10	2	0
39	0	3	30	12	27	3	6	0	27	3	15
48	62	385	1832	642	1763	81	362	90	5	45	93
753	87	19019	424	1159	905	2199	1033	126	469	174	68
8280	3198	1957	2002	7704	657	2489	0	4026	805	288	510
8375	7563	21079	6528	2694	1106	612	259	906	35	24	94
6567	2320	3553	8908	8610	16927	2748	998	528	84	37	37
3393	575	7502	278	3549	11	426	315	315	7	0	30
6	3	85	19	6	9	25	3	0	9	3	6
7	162	36	4	11	24	2	27	20	29	18	16
3	6	54	26	45	73	131	189	46	34	33	40
36	9	11	120	20	105	115	889	649	315	35	168
75	24	54	99	2792	281	356	116	2314	2680	0	250
33	67	0	65	343	646	18	0	657	489	116	434
7	6	51	32	51	95	190	26	25	82	64	40
68	11	64	261	347	121	118	322	189	272	329	918
0	57	0	28	7	36	1	0	278	162	61	161
8	0	0	18	4	0	1	23	1	5	1	11
61	8	170	73	154	267	61	198	53	247	312	77
2	12	0	32	13	0	26	0	191	55	161	46
58	65	72	101	159	238	123	79	137	188	65	72
66	0	73	29	22	139	139	358	44	102	110	22
29	0	29	7	71	78	86	14	321	171	128	21
27	0	0	789	45	161	72	72	90	63	9	9
1	0	0	0	0	0	50	0	29	0	29	27
0	7	4	2	0	49	0	0	25	0	154	0
45596	22561	64514	30460	33940	27324	17016	5837	12131	6844	2403	4558
4239	1319	3832	1831	1132	446	323	146	265	124	129	669
13416	7000	6484	6923	4349	3157	6619	402	807	385	77	727
27455	13805	53497	20002	24370	21397	8558	2972	5991	1432	570	846
160	272	239	333	3216	1139	649	1224	3686	3557	205	913
144	81	285	412	563	520	371	569	546	767	766	1206
181	77	174	958	310	617	445	523	783	579	472	170
1	7	4	2	0	49	50	0	54	0	183	27

TABLE 14. ABUNDANCE (MILLIONS) OF A.PLAICE FROM CANADIAN R.V.SURVEYS IN 3PS FROM 1977-92.

AGE	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.02	0.00	0.05	0.49	0.09	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.01
3	0.68	0.39	0.20	2.35	0.57	1.56	0.16	0.00	0.02	0.05	0.12	0.07	0.11	0.02	0.15	0.02
4	1.85	0.43	0.84	3.15	3.59	6.73	1.20	0.19	0.42	0.64	0.38	0.46	0.47	0.24	0.34	0.06
5	5.14	2.03	1.97	7.98	4.29	8.87	7.12	1.95	2.74	2.18	1.95	2.48	1.23	0.97	1.34	0.59
6	3.62	3.19	3.28	12.75	6.89	10.72	16.65	7.56	7.63	8.71	5.52	8.00	3.74	1.07	2.74	1.46
7	6.90	4.69	8.80	32.62	14.25	15.66	19.61	9.03	14.50	15.21	11.87	10.30	6.03	1.74	4.07	2.66
8	6.85	5.98	7.77	31.35	19.16	22.17	18.78	8.15	10.35	10.68	14.89	13.76	4.85	1.94	5.33	1.65
9	5.09	6.52	4.17	21.89	12.67	27.33	16.01	6.57	10.48	5.88	9.66	7.35	4.49	2.00	4.16	1.58
10	3.83	2.88	1.57	14.02	7.33	13.25	7.99	5.44	9.39	4.68	6.86	4.59	2.54	1.49	3.05	1.26
11	2.97	3.07	1.29	5.64	2.92	5.54	5.15	2.99	5.61	2.71	3.19	1.95	1.64	0.91	1.34	0.72
12	1.59	2.21	1.17	3.49	2.41	4.57	2.72	1.67	3.89	2.26	2.80	1.36	1.49	0.56	1.12	0.51
13	0.42	1.03	0.62	1.57	1.04	2.25	1.74	0.70	3.81	1.67	1.77	0.75	1.03	0.23	0.74	0.52
14	0.60	0.37	0.38	0.77	0.89	1.43	1.06	0.49	2.62	0.89	1.13	0.59	0.59	0.27	0.37	0.23
15	0.14	0.12	0.30	0.09	0.32	0.70	0.67	0.34	2.53	0.94	0.99	0.54	0.38	0.26	0.47	0.40
16	0.11	0.35	0.18	0.42	0.48	0.52	0.70	0.15	2.14	0.62	0.67	0.31	0.46	0.20	0.40	0.18
17	0.04	0.08	0.03	0.11	0.17	0.31	0.22	0.11	1.17	0.24	0.22	0.25	0.19	0.12	0.11	0.08
18	0.01	0.00	0.00	0.23	0.33	0.57	0.13	0.08	1.29	0.18	0.14	0.03	0.13	0.10	0.03	0.04
19	0.01	0.00	0.00	0.06	0.22	0.04	0.11	0.01	0.07	0.03	0.03	0.01	0.05	0.04	0.01	0.01
1+	39.86	33.34	32.63	138.98	77.61	122.28	100.04	45.44	78.67	57.56	62.18	52.81	29.44	12.16	25.81	11.97
2+	39.86	33.34	32.63	138.98	77.61	122.28	100.04	45.44	78.67	57.56	62.18	52.81	29.44	12.16	25.81	11.97
3+	39.84	33.34	32.58	138.49	77.52	122.21	100.04	45.43	78.67	57.56	62.18	52.81	29.44	12.15	25.77	11.96
4+	39.16	32.95	32.37	136.14	76.95	120.65	99.88	45.43	78.65	57.51	62.06	52.74	29.33	12.13	25.62	11.94
5+	37.31	32.52	31.53	132.99	73.36	113.92	98.68	45.24	78.23	56.87	61.68	52.28	28.86	11.88	25.28	11.89
6+	32.17	30.49	29.56	125.02	69.07	105.06	91.56	43.29	75.49	54.69	59.73	49.80	27.63	10.91	23.94	11.30
7+	28.56	27.30	26.28	112.26	62.18	94.34	74.90	35.73	67.86	45.98	54.21	41.80	23.89	9.85	21.20	9.84
8+	21.66	22.61	17.47	79.64	47.93	78.68	55.29	26.70	53.36	30.77	42.34	31.50	17.85	8.11	17.13	7.18
9+	14.80	16.64	9.71	48.29	28.78	56.51	36.51	18.54	43.01	20.10	27.46	17.73	13.00	6.17	11.80	5.53
10+	9.71	10.11	5.54	26.40	16.10	29.18	20.49	11.97	32.53	14.22	17.80	10.38	8.51	4.18	7.64	3.95
11+	5.88	7.24	3.97	12.37	8.78	15.92	12.50	6.53	23.14	9.54	10.94	5.79	5.96	2.68	4.59	2.69
12+	2.91	4.17	2.68	6.74	5.86	10.39	7.35	3.55	17.52	6.83	7.75	3.84	4.32	1.78	3.25	1.97
13+	1.32	1.96	1.51	3.25	3.45	5.82	4.63	1.88	13.63	4.57	4.95	2.48	2.83	1.21	2.13	1.46
14+	0.90	0.93	0.90	1.68	2.41	3.57	2.89	1.18	9.82	2.90	3.18	1.73	1.80	0.98	1.39	0.94
15+	0.31	0.55	0.51	0.91	1.52	2.14	1.83	0.69	7.20	2.01	2.05	1.14	1.21	0.71	1.02	0.71
16+	0.17	0.43	0.21	0.82	1.19	1.44	1.16	0.35	4.67	1.07	1.06	0.60	0.83	0.45	0.55	0.31
17+	0.06	0.08	0.03	0.40	0.71	0.92	0.46	0.20	2.52	0.45	0.39	0.29	0.37	0.26	0.15	0.13
18+	0.01	0.00	0.00	0.29	0.55	0.61	0.24	0.09	1.36	0.21	0.17	0.04	0.18	0.13	0.04	0.05

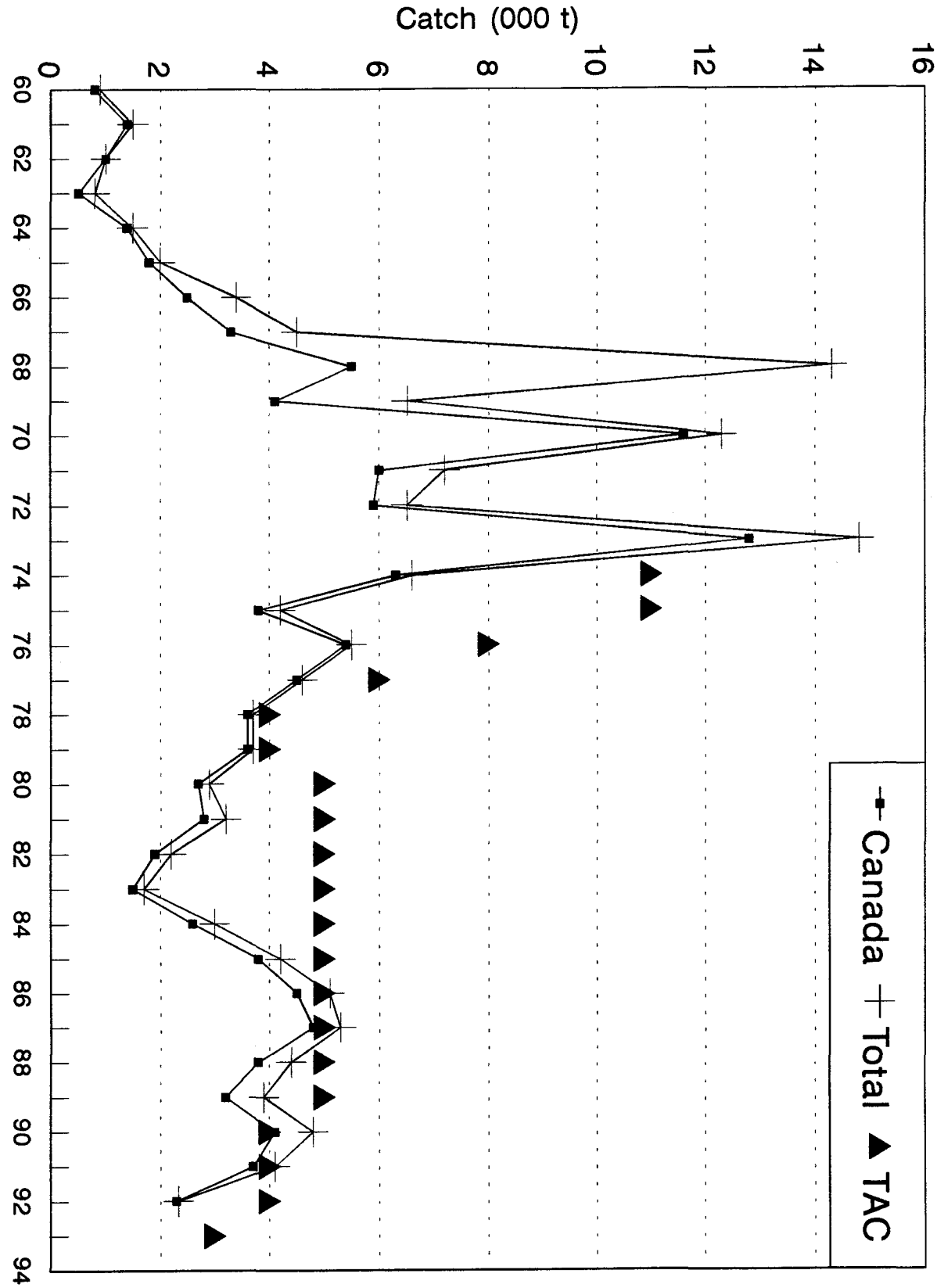

Fig.1. Catches and TAC's of American plaice in Subdiv. 3Ps.

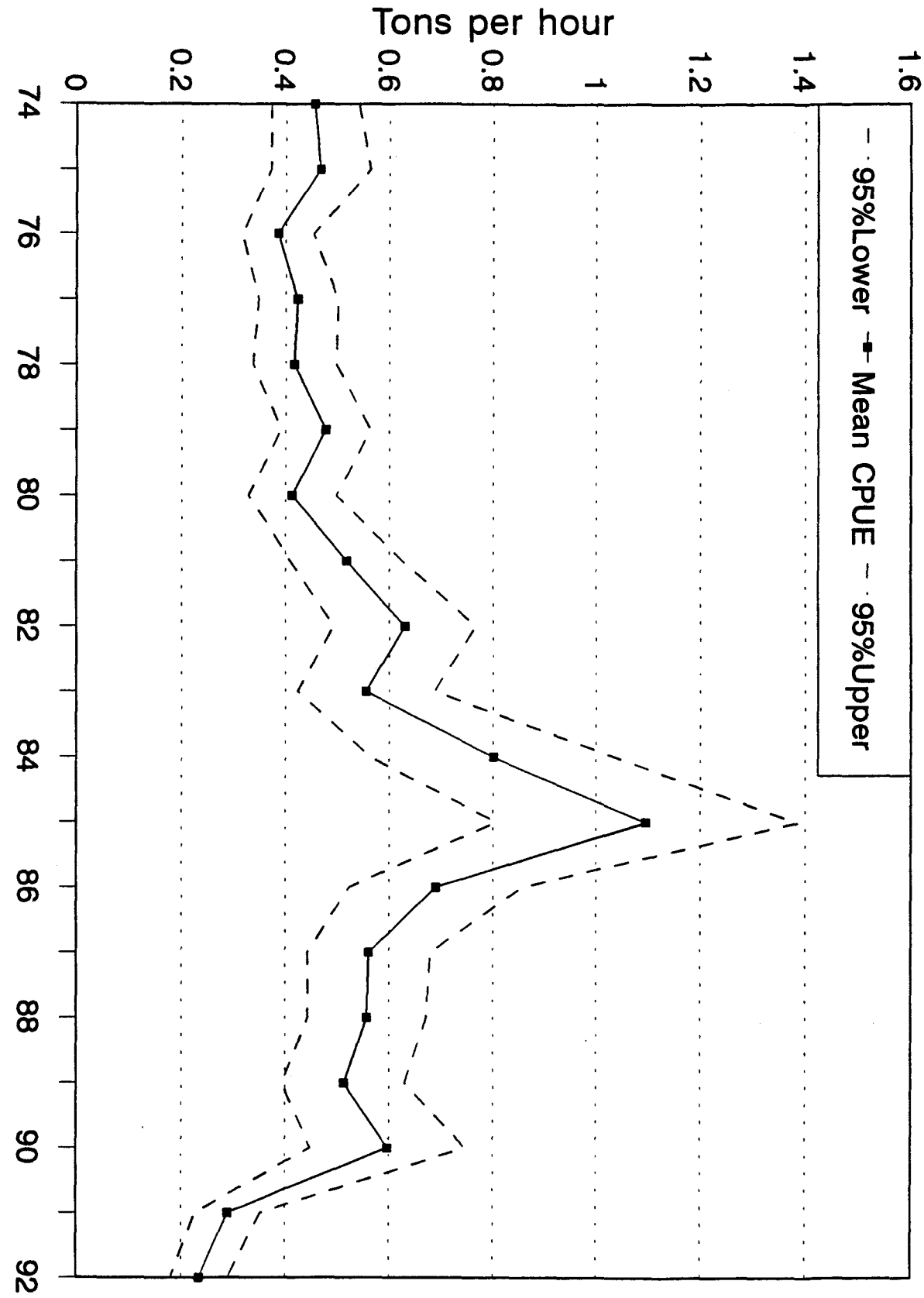

Fig. 2 Standardized CPUE with 95% confidence intervals for American Plaice in Div. 3Ps from 1974-1992.

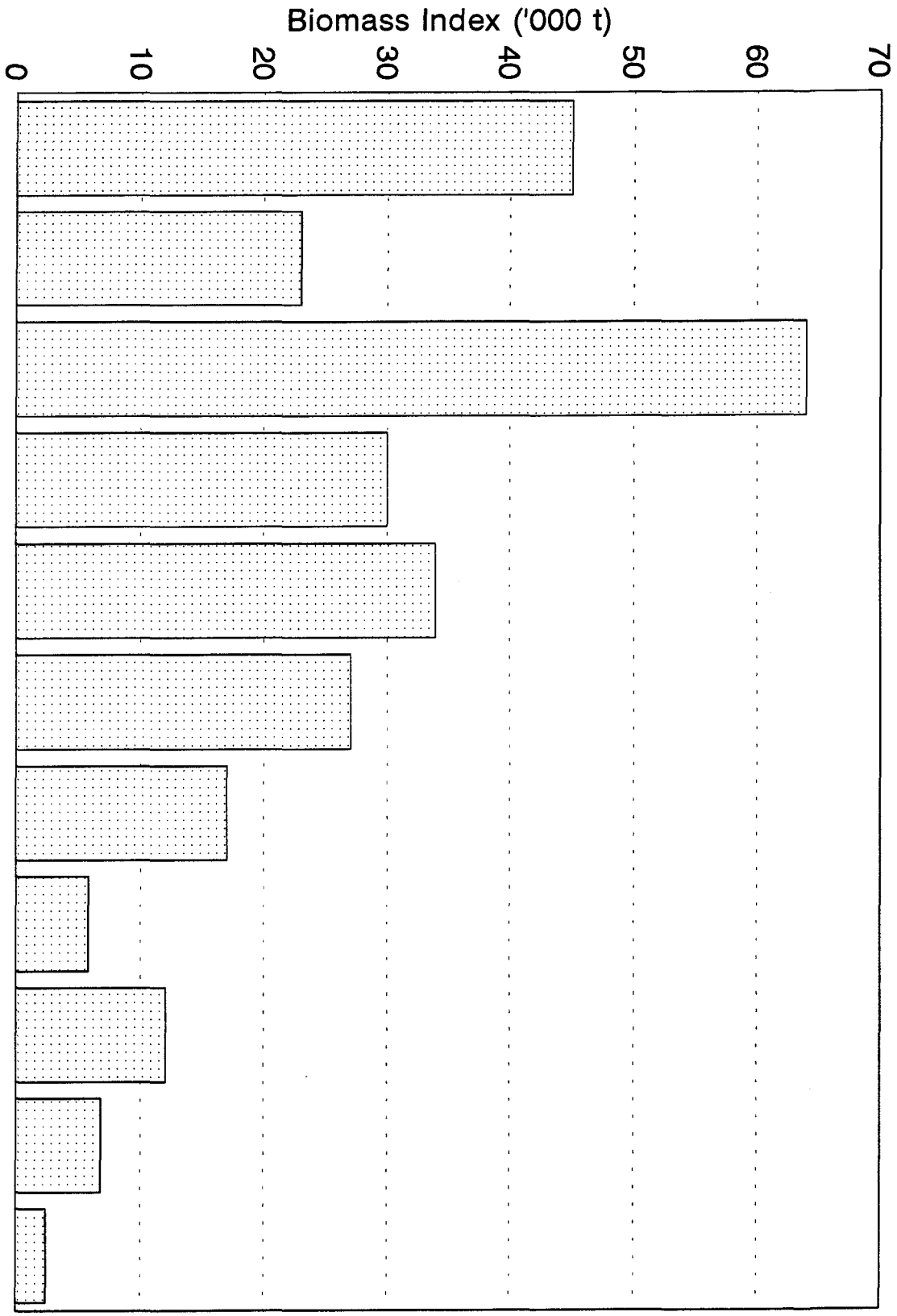

Fig. 3. Biomass index of A.plaice from RV surveys in Subdiv. 3Ps from 1983-1993.

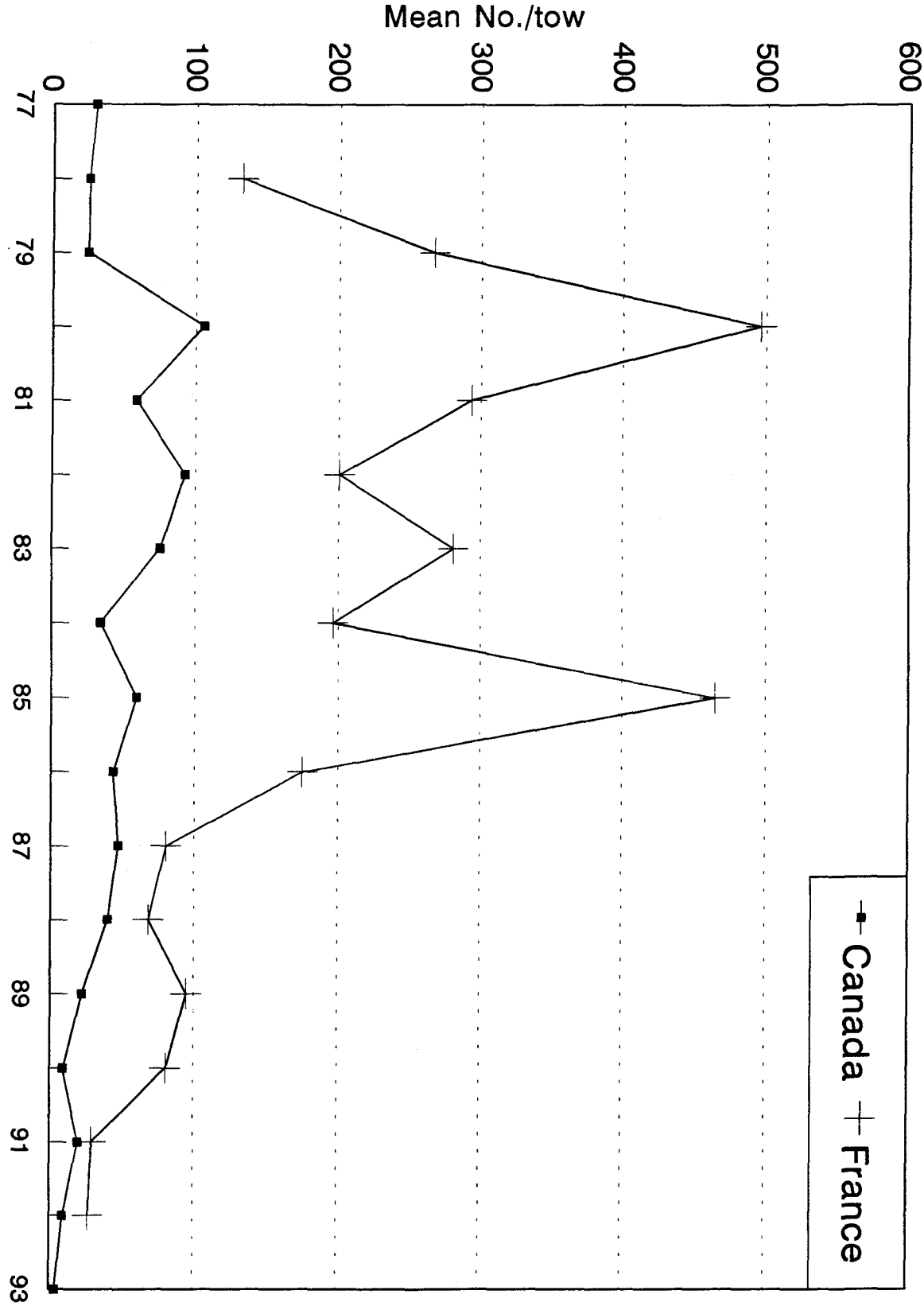

Fig. 4. Comparison of mean no./tow of A.plaice from Canadian and French RV surveys in Subdiv. 3Ps.