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American plaice in NAFO Subarea 2+Div. 3K - An assessment update

by

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ABSTRACT

Because of a limited amount of data from the commercial fishery, no sequential population analysis was attempted for this stock. Commercial catch rates have remained relatively stable since 1979, with the exception of 1981, when a large directed fishery occurred. Directed catches in 1982 and 1983 were between 300 and 500 t while the directed catch in 1981 was 5,000 t. Research vessel abundance estimates showed an increase for Division 2J over the period 1979-83 while those for Division 3K were stable over the same period. The assessment indicated that the stock appears to be in good condition and continuation of the 10,000 t TAC is recommended.

RESUME

Le volume limité de données obtenues de la pêche commerciale nous a empêché d'effectuer une analyse séquentielle de population pour ce stock. Les taux de capture commerciaux sont demeurés relativement stables depuis 1979, à l'exception de 1981, année où s'est pratiquée une importante pêche dirigée sur ce stock. En 1982 et 1983, les prises dirigées ont été comprises entre 300 et 500 t, alors qu'en 1981, elles avaient été de 5 000 t. Les estimations d'abondance découlant de relevés par navire de recherche indiquent une augmentation dans la div. 2J entre 1979 et 1983, alors que durant la même période, ces estimations ont été stables dans la div. 3K. D'après l'évaluation, le stock semble en bon état, et il est recommandé que le TPA soit maintenu au niveau de 10 000 t.

INTRODUCTION

This stock has been under TAC regulation since 1974. Up to 1976, most of the landings were by the foreign fleet (Table 1), with Canadian landings coming almost exclusively from the inshore sector. Since 1976, most of the landings have come from the Canadian fleet, with an offshore fishery developing since that time. Landings from Div. 3K have comprised over 85% of the total each year since 1975. The TAC was 6,000t during the period 1978-81, was raised to 10,000t in 1982, and remained at this level in 1983 and 1984.

ASSESSMENT

CATCH/EFFORT DATA

Catch rate and effort data are available from the Canadian offshore fishery for the period 1976-1983 (Table 2). As can be seen from this table, the amount of directed catch has fluctuated considerably between years, with very little directed catch in 1982 and 1983. Catch rates have remained relatively stable around 0.5t/hr over the past 5 years (with the exception of 1981), although the CPUE figures for some years are based on as little as 300t. The large directed catch of American plaice in 1981 was taken primarily in the first 3 months of the year, and occurred after cod allocations for the area were exhausted.

SAMPLING DATA

Table 3 shows sampling from the commercial fishery in 1983. Because otolith samples were available from the fourth quarter only for the offshore fishery, it was felt that calculation of numbers caught at age and mean weights at age for the commercial fishery would not be accurate. Table 4 shows catch numbers and mean weights from 1976-82.

RESEARCH VESSEL SURVEY DATA

Tables 5 and 6 show the mean number of American plaice per tow from random-stratified surveys by the *Gadus Atlantica* from 1977-83 in Divisions 2J and 3K respectively. The mean number per tow in Division 2J decreased slightly in 1983 from 1982, but was still significantly higher than the values observed between 1978 and 1981. The mean number per tow in Division 3K has remained stable from 1979 to 1983. Biomass estimates from these surveys (Table 7) show a significant increase in Div. 2J over the period 1979-1983, while those for Div. 3K have remained stable during this time, with the result that the total for Div. 2J+3K combined has increased steadily since 1979. It should be noted that during the period of time covered by the surveys, virtually all of the commercial landings have come from Div. 3K.

With regard to the biomass estimates, it should be pointed out that although the estimates are for selected strata within Div. 2J and 3K, these estimates represent virtually all of the American plaice biomass calculated for the total area surveyed. At the present time, there are no estimates of American plaice biomass in Div. 2G and 2H.

DISCUSSION

In 1982, a VPA was attempted on this stock (Brodie and Pitt 1982), but difficulties in arriving at precise parameters led to the conclusion that the analysis was not reliable. Although there are presently two more years of data available, the level of sampling of the small catch in 1983 did not permit calculation of numbers and weights at age for that year. Hence, it is unlikely that a reliable VPA can be produced for this stock in the near future. Also, with the change in the allocation scheme for the northern (2J3KL) cod stock, the directed fishery for American plaice observed in early 1981 did not materialize in 1982 or 1983, with the result that the offshore catch was reduced dramatically. Consequently, estimates of CPUE in these years were based on directed catches of only 500 and 310t respectively.

With abundance indices from research surveys on an upward trend, and estimates of commercial CPUE relatively stable, the stock appears to be in good condition. Based on the data presented in this paper, there is no new evidence to recommend a change in the current TAC of 10,000t, in place since 1981.

REFERENCES

- Brodie, W. B., and T. K. Pitt. 1982. Stock assessment update of American plaice in NAFO Subarea 2 - Division 3K. CAFSAC Res. Doc. 82/32.

Table 1. Nominal catches and TAC's (t), American plaice, NAFO Subarea 2 and Division 3K.

Year	[Inshore	Canada offshore	Total]	Poland	USSR	Other	Total	TAC
1967	395		395	1,134	1,701	414	3,644	
1968	1,023		1,023	1,889	2,911	128	5,951	
1969	1,689		1,689	867	4,129	217	6,902	
1970	3,751		3,751	378	8,160	397	12,686	
1971	2,486		2,486	233	2,597	32	5,348	
1972	1,188	9	1,197	849	6,760	317	9,123	
1973	1,368	16	1,384	225	3,011	520	5,140	
1974	462	106	568	91	4,643	308	5,610	10,000
1975	813	46	859	95	4,449	345	5,748	8,000
1976	1,741	736	2,477	118	3,373	131	6,099	8,000
1977	1,925	4,691	6,616	27	702	162	7,507	8,000
1978	1,723	1,452	3,175	138	123	86	3,522	6,000
1979	1,792	1,063	2,855	31	39	53	2,978	6,000
1980	1,149	3,728	4,877	39	26	91	5,033	6,000
1981	1,022	6,332	7,354	-	56	30	7,440	6,000
1982	576	1,265	1,841	13	8	32	1,894	10,000
1983 ^a	434	856	1,290	252	4	107	1,653	10,000
1984								10,000

^aPreliminary.

Table 2. Catch and effort, Can(N) offshore trawlers, American plaice, Subarea 2 and Division 3K.

Year	Total Catch (t)	Directed CPUE (t/hr)	Effort (hr) (calculated)	Directed catch (t)
1976	6,099	0.395	15,441	701
1977	7,507	0.402	18,674	3,628
1978	3,522	0.375	9,392	652
1979	2,978	0.467	6,377	315
1980	5,033	0.525	9,587	2,151
1981	7,440	0.970	7,670	4,998
1982	1,894	0.505	3,751	500
1983 ^a	1,653	0.480	3,444	310

^aPreliminary.

Table 3. List of commercial sampling by quarter and division available for 1983, for American plaice in Divisions 2J and 3K as collected by the St. John's Commercial Sampling Section.

		Quarter				Total
		1	2	3	4	
Offshore						
Can(N)	Catch (t)	228	188	77	260	753
	Samples	-	-	-	2	2
	Measured	-	-	-	718	718
	Otoliths	-	-	-	188	188
Inshore						
	Catch (t)	-	42	329	63	434
	Samples	-	-	3	-	3
	Measured	-	-	422	-	422
	Otoliths	-	-	165	-	165

Table 4. Catch (nos. $\times 10^{-3}$) and average weight (kg) matrices for American plaice in NAFO Subarea 2+Div. 3K, 1976-82. Values for 1983 were not calculated.

AM, PLAICE 2+3K CATCH MATRIX

AGE	1976	1977	1978	1979	1980	1981	1982
7	1544	403	132	201	83	1	64
8	1861	1026	277	858	231	23	201
9	1317	1481	500	1791	772	121	393
10	1492	1657	830	1467	2158	456	673
11	1322	1430	1153	901	1751	1449	651
12	1240	1435	1134	389	1682	3070	352
13	964	911	974	219	1097	2665	232
14	259	677	474	92	502	1452	113
15	138	430	259	21	253	934	57
16	54	349	186	6	173	700	23
17	39	140	65	10	46	245	5
18	27	84	57	1	33	154	5
19	13	17	9	1	8	25	1

AM, PLAICE 2+3K WEIGHT MATRIX

AGE	1976	1977	1978	1979	1980	1981	1982
7	0.293	0.293	0.226	0.268	0.351	0.241	0.380
8	0.336	0.336	0.272	0.297	0.333	0.258	0.425
9	0.423	0.423	0.317	0.374	0.372	0.289	0.567
10	0.511	0.511	0.392	0.484	0.373	0.344	0.567
11	0.619	0.619	0.514	0.647	0.456	0.375	0.690
12	0.756	0.756	0.580	0.882	0.576	0.468	0.870
13	0.939	0.939	0.778	1.189	0.790	0.588	1.114
14	1.239	1.239	1.011	1.381	0.935	0.780	1.429
15	1.402	1.402	1.205	1.959	1.163	1.071	1.676
16	1.643	1.643	1.371	1.960	1.278	1.348	1.874
17	1.852	1.852	1.639	1.815	1.730	1.623	2.490
18	2.088	2.088	1.690	1.960	2.055	1.955	2.073
19	2.364	2.364	2.184	2.000	2.347	2.605	2.490

Table 5. Mean number of American plaice per tow (with approximate upper and lower 95% confidence intervals) from R.V. surveys in Division 2J. The same strata were used in the calculations for each year.

Age	GA3 1977	GA15 1978	GA29 1979	GA44 1980	GA58,59 1981	GA71,72 1982	GA86,87,88 1983
1							
2					0.01	0.01	
3		0.03			0.01	0.17	0.06
4	0.20	0.57	0.32	0.07	0.81	0.38	0.85
5	8.54	5.24	2.20	0.66	3.41	3.86	1.88
6	17.56	15.90	9.45	5.42	21.19	10.83	10.32
7	34.54	24.24	16.99	27.48	29.15	33.06	32.13
8	48.43	20.35	17.62	21.65	22.98	38.34	41.28
9	27.63	15.47	10.64	13.08	8.92	38.63	23.81
10	12.77	9.80	5.89	8.69	5.99	17.06	17.09
11	8.13	5.50	2.66	4.82	2.15	6.81	8.80
12	5.62	4.42	3.55	4.41	0.87	4.18	2.50
13	3.71	3.71	2.11	1.96	0.07	2.56	1.62
14	2.10	1.70	0.62	1.16		1.13	0.42
15	0.87	1.22	0.16	0.34		0.22	0.16
16		0.58	0.06	0.15		0.11	
17		0.20		0.05		0.02	0.01
18		0.01		0.02			
19		0.01					
UNK					0.08	0.03	0.01
Upper	229.08	151.72	264.18	121.63	129.57	215.11	216.53
Mean	170.10	108.95	72.27	89.96	95.64	157.40	140.94
Lower	111.09	66.15	-119.64	58.25	61.73	99.68	65.35
No. Sets	67	49	44	44	66	107	84

Table 6. Mean number of American plaice per tow (with approximate upper and lower 95% confidence intervals) from R.V. surveys in Division 3K. The same strata were used in the calculations for each year.

Age	GA15 1978	GA29 1979	GA44 1980	GA58,59 1981	GA71,72 1982	GA86,87,88 1983
1		0.01				
2			0.01		0.02	0.01
3	0.24	0.01	0.08	0.16	0.31	0.57
4	4.02	0.40	0.12	0.23	0.55	0.79
5	10.28	2.31	1.19	1.09	1.20	2.97
6	15.12	5.06	4.01	2.33	2.95	5.46
7	13.59	6.89	10.31	8.18	5.75	9.46
8	10.05	7.51	7.25	11.65	7.69	9.72
9	8.65	6.11	5.29	6.71	6.29	4.00
10	7.23	4.45	4.49	7.19	3.27	3.10
11	4.33	2.07	2.62	2.24	2.18	1.13
12	3.72	2.64	2.09	3.03	1.06	1.18
13	3.23	1.32	1.03	1.45	0.86	0.56
14	1.67	0.43	0.66	0.61	0.42	0.30
15	1.30	0.17	0.26	0.37	0.22	0.12
16	0.67	0.15	0.10	0.26	0.07	0.03
17	0.25	0.01	0.05		0.05	
18	0.08	0.03	0.03	0.04	0.01	
19	0.01					
UNK	0.04	0.02		0.01	0.01	0.04
Upper	117.13	50.48	50.36	56.72	39.50	49.10
Mean	84.48	39.59	39.59	45.55	32.91	39.44
Lower	51.84	28.66	28.83	34.39	26.31	29.78
No. Sets	70	69	78	95	115	105

Table 7. Biomass estimates (t) for American plaice from random stratified surveys in Division 2J and 3K, 1978-83. The same strata were used in the calculations for each year.

Division	Year					
	1978	1979	1980	1981	1982	1983
2J	56,881	36,487	55,398	63,101	88,164	93,685
3K	57,314	31,354	32,480	37,807	24,787	30,873
Total	114,195	67,841	87,878	100,908	112,951	124,558