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Status of the Witch Flounder stock on St. Pierre Bank (NAFO Subdivision 3Ps)

by

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Abstract

Peak catches of witch flounder in Subdivision 3Ps occurred during 1967-69 and 1977 between 4,000-5,000 t. During the last 5 years, however, catches have been less than 500 t annually. The fishery has essentially been a by-catch of other groundfish species such as cod, redfish and American plaice. Biomass estimates from surveys suggest average levels of about 5,000-6,000 t. The maximum age in the stock has declined from 22 years old in 1976 to 14 years old in recent years, a removal of 8 age groups. The age structure has remained relatively stable during the last 5 years despite the fact that catch levels over the same period have been essentially negligible.

Résumé

Les prises de plie grise dans la sous-division 3Ps ont atteint leur point culminant (de 4 000 t à 5 000 t) entre 1967 et 1969 et en 1977. Cependant, au cours des cinq dernières années, les prises annuelles ont été inférieures à 500 t. La pêche a essentiellement été composée de prises accessoires d'autres espèces de poisson de fond comme la morue, le sébaste et la plie canadienne. Selon des estimations de la biomasse, les niveaux moyens sont de 5 000 t à 6 000 t environ. L'âge maximal des poissons qui composent la population a diminué de 22 ans en 1976 à 14 ans au cours des dernières années; ce qui représente l'élimination de huit groupes d'âge. La structure par âge est restée relativement stable au cours des cinq dernières années, malgré le fait que les niveaux de prises durant la même période aient été essentiellement négligeables.

THE COMMERCIAL FISHERY

The fishery for witch in Subdivision 3Ps during the early 1960's was relatively stable at about 1000 t annually (Fig. 1). In the late 1960's landings increased dramatically to over 4,000 t, then generally declined except for 1973 and in particular 1977, where there was an anomalous peak at over 4,000 t. However, over the last 5 years annual catches have generally been less than 500 t (Fig. 1). The fishery here has essentially been a by-catch of other groundfish fisheries such as cod, redfish, and American plaice. With the reduced catches of cod and redfish in particular on St. Pierre Bank, it is not too surprising to see very low levels of catch.

There is also a small Danish seine and Scottish seine fishery in the Fortune Bay area of Subdiv. 3Ps which accounts for nearly half of the Subdiv. 3Ps catch in recent years. This seine fishery is generally a mixed fishery of witch, Greenland halibut, cod, and redfish by local fishermen.

Due to low levels of catch and the by-catch nature of the fishery, it was not possible to secure any commercial data from the 1985 landings (Table 1).

ESTIMATES OF BIOMASS FROM RESEARCH VESSEL SURVEYS

Stratified-random research vessel surveys have been conducted on St. Pierre Bank since 1972. From 1972-83 they have been conducted by the A. T. CAMERON during February-March. In 1983-84 they were conducted by the ALFRED NEEDLER a couple of months later in the year. In 1985 and 1986 the surveys were conducted by the WILFRED TEMPLEMAN in February-March. All three vessels used different types of fishing gear and no adjustments have been made to the survey estimates among the three different vessels.

As shown in Table 2 survey coverage is not always complete, however, for most years the more important strata have been surveyed. For recent years when coverage was most complete biomass estimates ranged from about 5,000 t in 1983 to about 6,200 t in 1986, with the 1986 estimate being the second highest in the series. It should be noted, however, that as pointed out earlier, there may be differences in catchability among the vessels and gears which have not been taken into account.

An attempt was made to standardize the survey data by plotting indices of biomass from strata common to all surveys. The results are shown in Table 3 and Fig. 2. Stratified mean weights (kg) per set ranged from about 2 kg in 1979 to about 11 kg in 1984 and generally fluctuated between the two almost on an annual basis. This is probably due to the fact that several of the more important adjacent strata could not be used and may contain significant levels of biomass in certain years, therefore, it is considered more prudent to interpret Table 2 on a stratum by stratum basis.

AGE COMPOSITION

Abundance estimates ('000's) at age from the 1976-85 surveys are presented in Table 4. In 1976, ages from the survey ranged from 2 to 22 years. Over the 1976-80 period, the maximum age steadily declined from 22 years to 14 years, a reduction of 8 age groups. The age structure has remained relatively stable since 1980 despite the fact that recent catch levels over the same period have been essentially negligible (Fig. 3A, 3B).

CONCLUSIONS

The recent decline in landings has been caused by a reduction in the by-catch of witch in the cod and redfish fisheries on St. Pierre Bank, rather than by a reduction in stock biomass. With the research vessel surveys showing at least relative stock stability, there is no cause to advise a change in the TAC from its current level of 3,000 t. However, it should be noted that this figure is considered a ceiling and is not a realistic level of removals implied by fishing at F_{0.1}.

Table 1. Nominal catches of witch flounder NAFO Subdivision 3Ps in 1985.

Table 2. Witch - average weight (kg) per 30 minute set - NAFO Subdivision 3Ps. (No. of sets shown in parentheses.)

Stratum	ATC 247 and 248	ATC 261 1976	ATC 273 and 275	ATC 287 1978	ATC 302 1979	ATC 316 1980	ATC 330 1981	A. NEEDLER 9 1983	A. NEEDLER 26 1984	W.T. 26 1985	W.T. 45 1986
306	1.10(6)	3.21 (6)	1.49(9)	2.63(5)	1.72(2)	2.43(3)	0.70(3)	3.30 (4)	0.15(2)	1.75 (2)	2.78 (3)
307	0.34(4)	2.21 (4)	0.03(7)	0.0 (4)	0.45(2)	0.0 (3)	0.0 (4)	0.38 (4)	1.00(2)	0.33 (3)	0.27 (3)
308	0.0 (2)	0.0 (4)	0.0 (2)	0.0 (4)	0.0 (2)	0.0 (2)	0.0 (2)	0.0 (3)	0.00(2)	0.00 (2)	0.0 (2)
309	1.91(7)	6.14 (6)	3.38(9)	3.97(6)	0.0 (2)	3.75(2)	0.0 (2)	3.00 (3)	1.95(2)	4.67 (3)	2.50 (2)
310	2.84(4)	6.94 (6)	6.63(9)	4.01(6)	4.09(2)	6.00(2)	4.00(3)	1.67 (3)	3.25(2)	5.67 (3)	7.00 (2)
311	9.91(6)	24.29 (4)	1.25(8)	1.47(4)	0.22(2)	0.25(2)	0.0 (3)	0.0 (3)	3.00(2)	0.55 (4)	23.00 (3)
312	0.09(5)	0.91 (4)	0.0 (2)	0.0 (3)	-	0.0 (2)	0.35(2)	0.0 (3)	0.50(2)	0.00 (2)	0.0 (2)
313	9.88(6)	8.32(10)	17.07(5)	6.17(5)	22.24(2)	25.00(2)	8.50(2)	10.17 (3)	2.50(2)	3.85 (2)	3.75 (2)
314	0.0 (2)	0.28 (4)	0.0 (3)	-	0.0 (2)	0.0 (5)	0.0 (5)	0.0 (7)	0.00(4)	0.00 (7)	0.0 (8)
315	0.0 (2)	0.34 (4)	-	0.0 (3)	0.0 (4)	0.0 (2)	0.40(3)	1.20 (8)	2.20(5)	0.00 (7)	0.75 (6)
316	5.45(4)	33.33 (6)	15.17(6)	18.76(3)	5.90(2)	16.50(2)	-	41.00 (4)	30.50(2)	37.17 (3)	35.50 (2)
317	39.50(4)	11.55 (4)	6.98(4)	0.0 (3)	4.43(2)	0.15(2)	5.17(3)	98.33 (3)	119.75(2)	2.00 (2)	4.00 (2)
318	1.91(7)	6.05 (6)	5.90(2)	14.74(2)	7.26(2)	-	0.95(2)	10.07 (3)	0.95(2)	-	59.50 (2)
319	1.25(4)	1.59 (6)	1.82(4)	0.91(2)	18.84(4)	16.50(2)	0.93(7)	1.00 (7)	2.08(6)	0.75 (2)	2.38 (8)
320	0.15(3)	-	-	-	0.0 (6)	0.0 (2)	0.0 (4)	0.86(14)	0.00(8)	0.00 (5)	0.0 (9)
321	0.68(2)	-	0.0 (3)	-	0.0 (5)	0.0 (2)	0.0 (4)	0.0 (10)	0.00(6)	0.00 (7)	0.0 (10)
322	0.0 (4)	-	0.0 (2)	0.0 (2)	0.77(8)	0.0 (2)	0.31(8)	0.18(11)	0.44(8)	0.00(13)	0.09(12)
323	0.0 (4)	93.36(2)	0.15(3)	-	0.0 (3)	3.75(2)	1.00(2)	9.50 (6)	0.38(4)	4.33 (3)	0.14 (5)
324	0.0 (2)	-	-	0.0 (2)	0.0 (2)	-	0.0 (2)	0.0 (4)	0.00(3)	0.00 (2)	0.0 (5)
325	0.0 (2)	-	0.0 (2)	0.0 (2)	0.0 (4)	0.0 (2)	0.0 (5)	0.0 (8)	0.18(5)	0.00 (3)	0.0 (8)
326	-	-	0.0 (2)	0.0 (2)	0.0 (2)	0.0 (2)	0.0 (2)	0.0 (3)	0.00(2)	-	0.0 (2)
705	6.02(4)	7.15(4)	3.99(5)	13.39(4)	7.94(2)	12.50(2)	-	4.93 (3)	3.75(2)	6.60 (2)	7.00 (2)
706	8.55(3)	20.56(4)	8.63(2)	24.64(3)	9.99(2)	17.75(2)	2.40(4)	11.30 (5)	8.50(2)	6.07 (4)	12.63 (4)
707	3.29(6)	1.29(4)	10.90(2)	11.13(2)	9.53(2)	-	-	6.10 (3)	5.75(2)	-	10.50 (2)
708	13.77(3)	6.23(4)	-	4.31(2)	0.80(2)	-	-	2.75 (2)	3.57(2)	-	7.50 (2)
709	3.29(2)	-	-	-	-	-	-	0.15 (2)	0.20(2)	-	-
710	-	-	-	-	-	-	-	1.79 (3)	1.50(2)	1.00 (2)	3.00 (2)
711	12.49(2)	-	-	-	4.77(2)	7.30(2)	2.95(2)	5.49 (8)	4.40(5)	4.89 (8)	8.28 (9)
712	2.73(2)	-	-	8.39(2)	6.13(2)	10.25(2)	1.30(3)	3.73 (7)	-	7.02 (6)	7.50 (9)
713	-	-	-	-	4.31(2)	2.67(6)	1.20(2)	2.48 (7)	-	2.99 (8)	5.60 (5)
714	2.39(2)	-	4.20(2)	-	4.54(2)	5.70(8)	1.32(6)	1.31(10)	-	-	11.90 (5)
715	3.81(5)	2.67(4)	9.08(6)	4.69(3)	3.29(2)	2.35(2)	1.50(2)	6.33 (3)	2.25(2)	-	5.50 (2)
716	4.09(2)	8.32(6)	4.47(6)	8.11(4)	3.63(2)	11.25(4)	1.50(2)	5.00 (4)	4.47(3)	7.44 (5)	16.57 (4)
Total tons	3396	8090	2052	2983	4330	5475	1124	4955	3738	2835	6223

Table 3. Weighted mean weight (kg) per tow of witch from strata common to each annual survey in NAFO Subdivision 3Ps.

Stratum	307	309	310	311	313	317	319	Weighted Mean Wt/tow
Area (Sq.N.Mi)	(395)	(296)	(170)	(317)	(165)	(193)	(984)	T=2,520
YEAR								
1972	0.0	1.31	9.53	0.85	6.58	4.99	5.22	3.75
1973	0.0	17.86	6.81	0.0	6.19	2.98	1.57	3.80
1974	0.76	10.84	6.70	8.68	20.43	25.99	11.80	10.87
1975	0.0	2.02	1.92	4.77	33.29	9.48	0.41	4.03
1976	0.34	1.91	2.84	9.91	9.88	39.50	1.25	5.88
1977	2.21	6.14	6.94	24.29	8.32	11.55	1.59	6.64
1978	0.03	3.38	6.63	1.25	17.07	6.98	1.82	3.37
1979	0.0	3.97	4.01	1.47	6.17	0.0	0.91	1.68
1980	0.45	0.0	4.09	0.22	22.24	4.43	18.84	9.53
1981	0.0	3.75	6.00	0.25	25.00	0.15	16.50	8.97
1982	0.0	0.0	4.00	0.0	8.50	5.17	0.93	1.59
1983	0.38	3.00	1.67	0.0	10.17	98.33	1.00	9.11
1984	1.00	1.95	3.25	3.00	2.50	119.75	2.08	10.97
1985	0.33	4.67	5.67	0.55	3.85	2.00	0.75	1.75
1986	0.27	2.50	7.00	23.00	3.75	4.00	2.38	5.18

Table 4. Abundance estimates (000's) of witch flounder from research vessel surveys in Div. 3Ps.

Age	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1										
2	36	4	-	6	1777	41	-	18	-	22
3	192	22	-	27	13456	676	39	33	14	16
4	445	13	89	116	16825	775	477	186	32	85
5	373	108	158	141	20203	613	845	697	153	278
6	1298	56	144	149	29358	1219	659	1255	562	1472
7	725	238	194	752	29928	3338	527	2294	1401	1947
8	942	478	340	1355	13567	3590	629	2556	2112	1640
9	2194	776	535	1342	7556	2421	779	2902	2446	878
10	2271	1675	803	1520	4328	2190	620	2193	2348	810
11	2184	2174	973	1290	4782	1743	268	1213	962	553
12	1380	2964	807	784	2916	675	292	248	325	562
13	748	1845	599	293	1066	46	212	23	86	191
14	337	1577	483	138	244	9	11		18	16
15	242	1000	203	18	-	-	-	-	-	-
16	245	508	127	10	-	-	-	-	-	-
17	55	409	52	-	-	-	-	-	-	-
18	93	254	30	-	-	-	-	-	-	-
19	28	120	1	-	-	-	-	-	-	-
20	35	54	-	-	-	-	-	-	-	-
21	20	-	-	-	-	-	-	-	-	-
22	4	-	-	-	-	-	-	-	-	-
Total	13847	14275	5538	7941	146006	17336	5358	13618	10459	8470

NOMINAL CATCH (METRIC TONS)

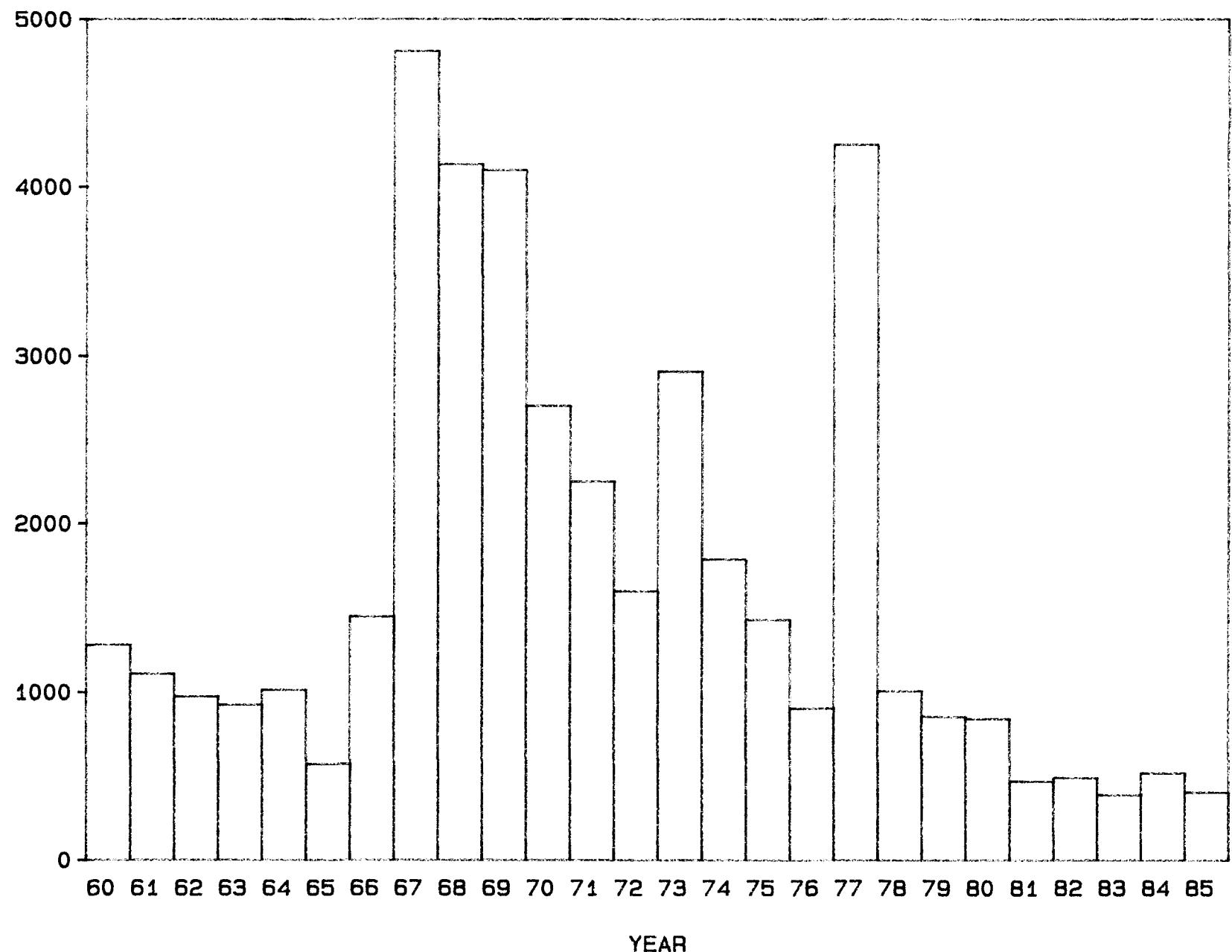


FIG.1 LANDINGS OF WITCH FLOUNDER FROM NAFO SUBDIVISION 3PS FROM 1960-85

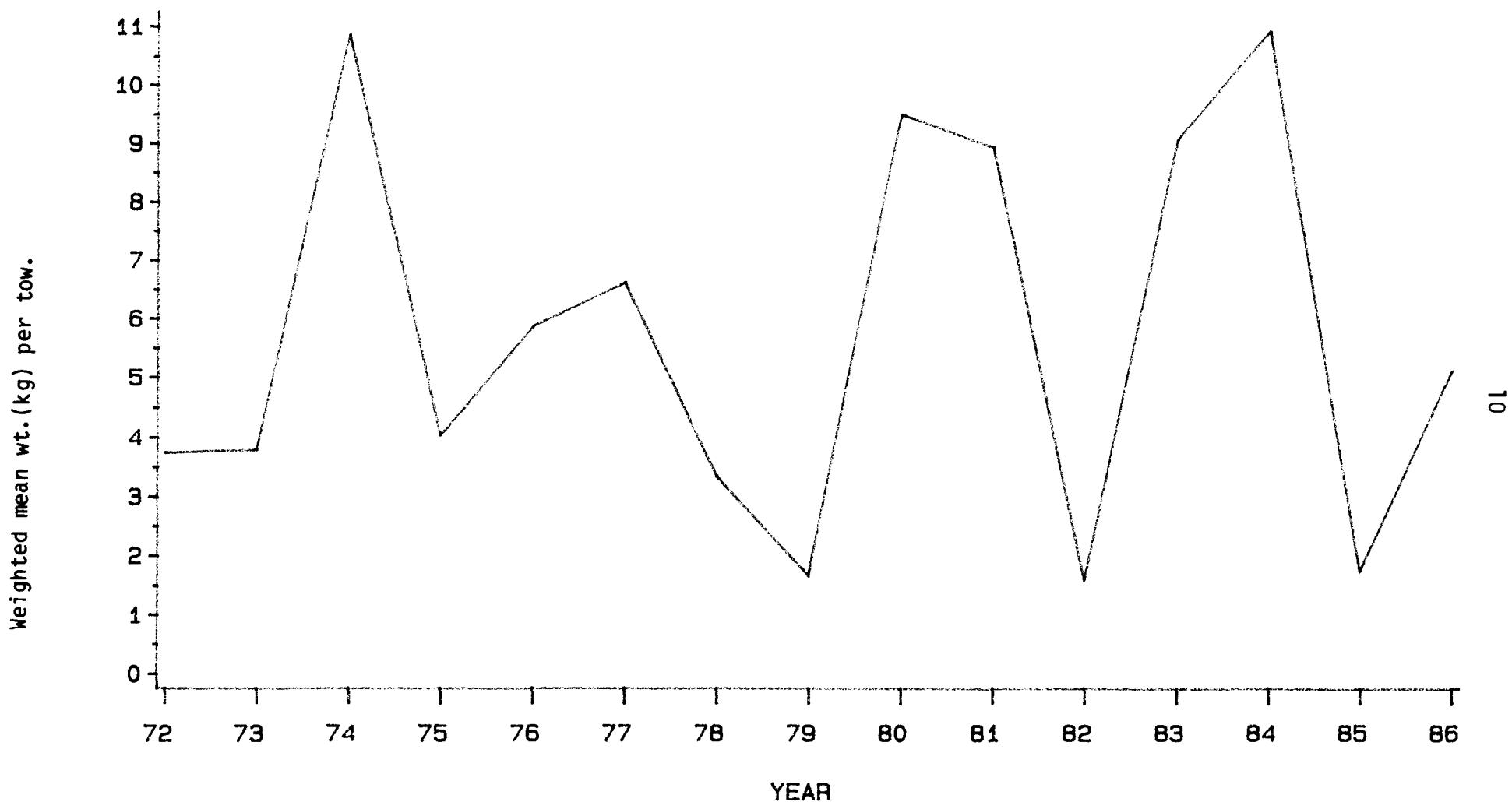


FIG. 2 WEIGHTED MEAN WEIGHT (KG) PER TOW OF WITCH FROM STRATA
COMMON TO EACH ANNUAL SURVEY IN NAFO SUBDIVISION 3PS

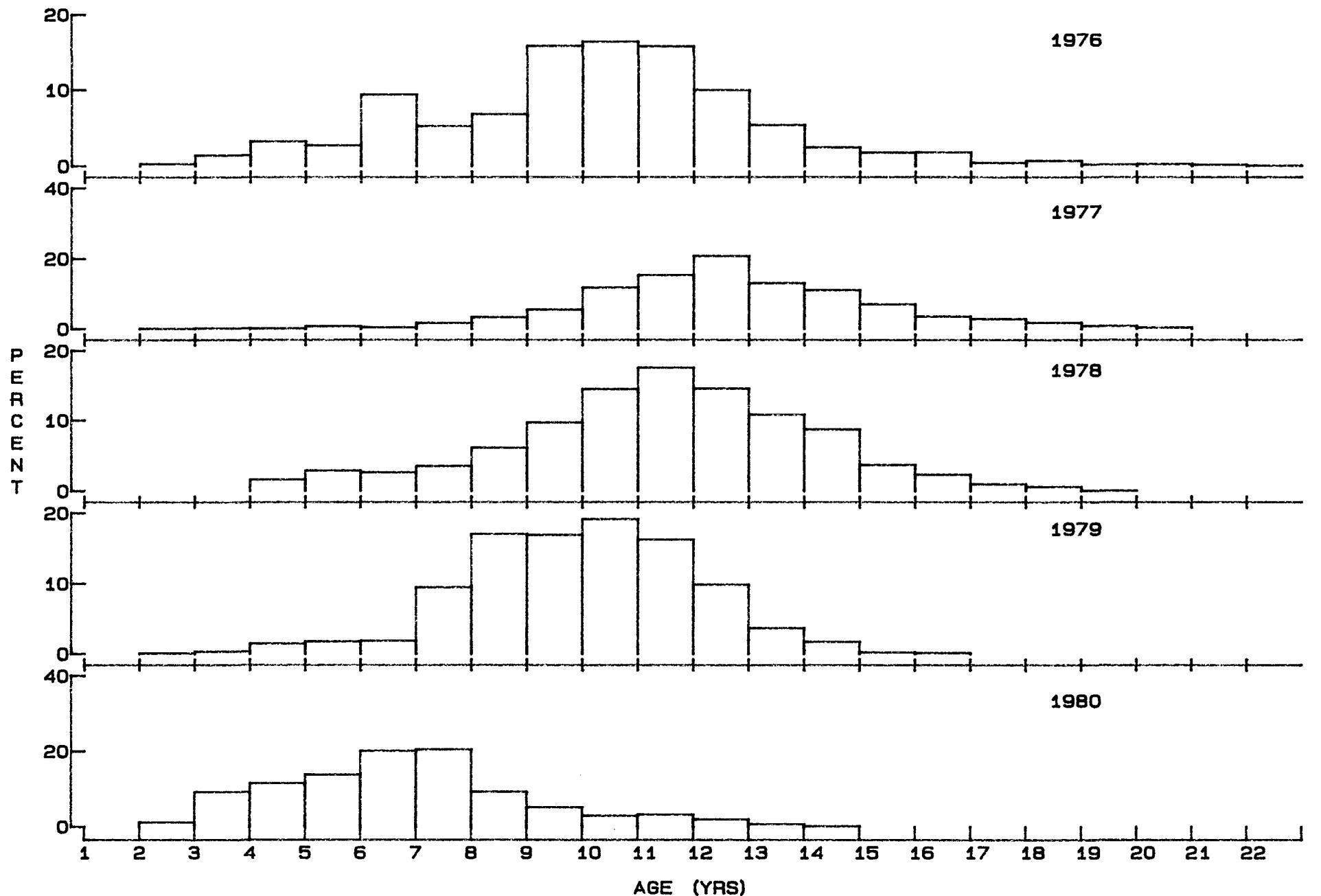


FIG 3A. AGE COMPOSITION OF WITCH FLOUNDER FROM RESEARCH VESSEL SURVEYS IN DIV. 3PS.

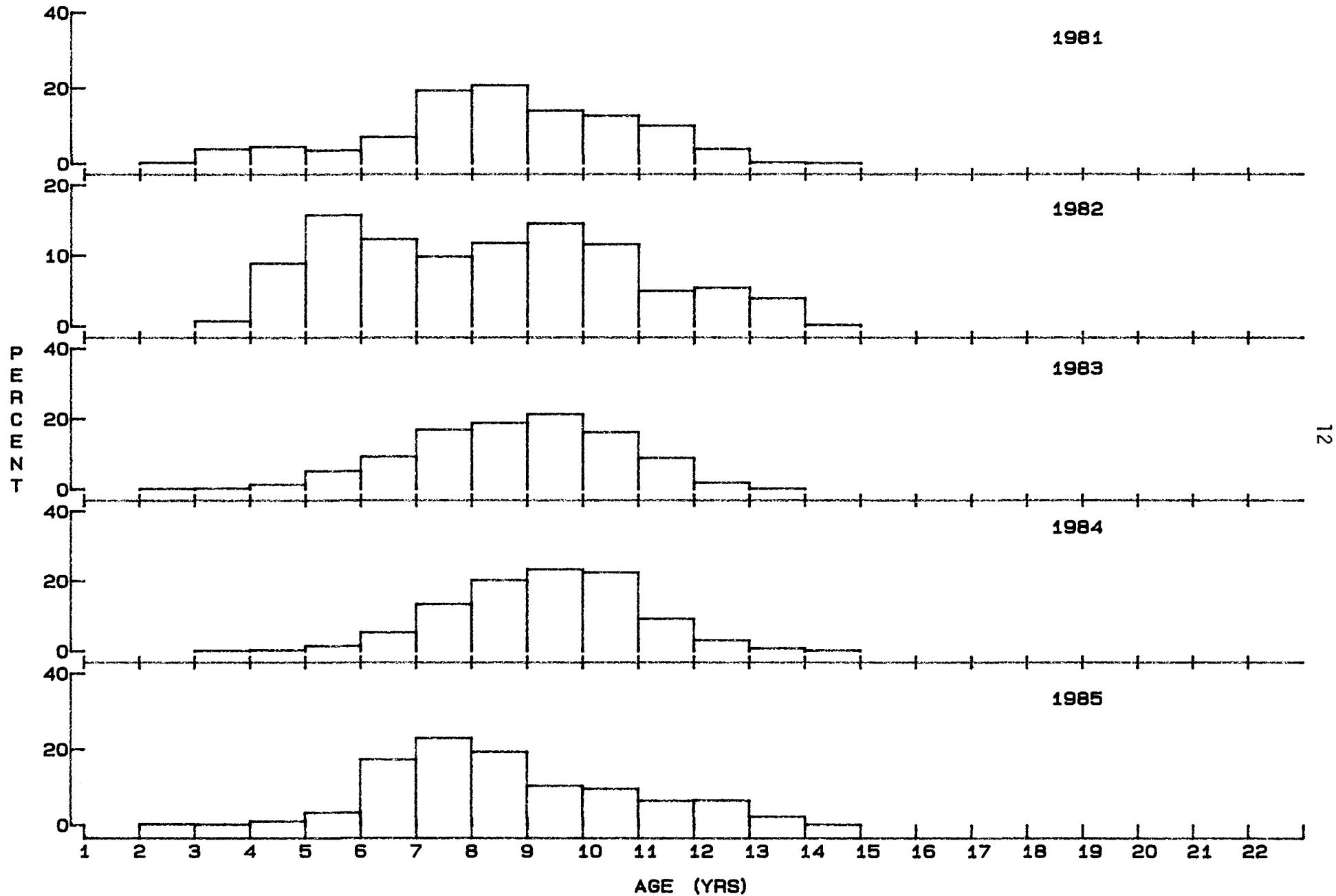


FIG 3B. AGE COMPOSITION OF WITCH FLOUNDER FROM RESEARCH VESSEL SURVEYS IN DIV. 3PS.