Witch Flounder in NAFO Subdivison 3Ps

by

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ABSTRACT

Fishing effort towards witch flounder in Subdivision 3Ps has been negligible over recent years with average catches over the last three years of less than 500 t. Research vessel surveys indicate that the stock size in this area is relatively small and over the last several years has been stable at levels of minimum trawlable biomass of about 5,000 t. Since 1974, the number of age groups have been reduced from 18 to 13, however, the weight at age has increased. As a result, levels of biomass for this stock do not appear to have been adversely affected.

RESUME

L'effort de pêche dirigé sur la plie grise dans la subdiv. 3Ps a été négligeable ces dernières années, les prises moyennes des trois dernières étant inférieures à 500 t. Les relevés par navires de recherche indiquent que l'effectif de stock de cette région est relativement faible et est stable depuis plusieurs années à des niveaux de biomasse chalutable minimale de 5 000 t environ. Depuis 1974, le nombre de groupes d'âge a diminué, passant de 18 à 13, mais le poids à un âge donné a augmenté. Comme résultat, les niveaux de biomasse de ce stock ne semblent pas avoir été défavorablement affectés.

COMMERCIAL LANDINGS

Over the past 20 years landings of witch flounder from Subdivision 3Ps have fluctuated from a low of 323t in 1983 to as high as 4805 t in 1967 (Fig. 1). Landings in the last 6 years have been less than 1000 t annually and in the past 3 years less than 500 t annually (Fig. 1). The fishery on St. Pierre Bank has always been a by-catch fishery of other groundfish fisheries and as a result of reduced fishing effort and possibly stock size, the landings are now nearly negligible. In fact, much of the catch reported for Subdivision 3Ps is taken by seiners in Fortune Bay where there is a local stock of witch flounder not considered to be biologically related to that of St. Pierre Bank. Because of such low levels of catch it has not been possible to obtain samples from the commercial fishery of witch flounder in these areas for the last several years.

ESTIMATES OF BIOMASS FROM RESEARCH VESSEL SURVEYS

Stratified-random biomass surveys for groundfish have been conducted on St. Pierre Bank by the research vessel A.T. CAMERON during Feb.-March from 1972-81. The 1982 survey, however, was delayed until June whereas the 1983 survey was conducted in May by the research vessel ALFRED NEEDLER. Results of the surveys are shown in Table 1. Except for 1983 the entire area has never been surveyed, however, the major strata for witch have been covered from about 1976 to 1983. The estimates of total biomass (Table 1) are therefore the sum of estimated biomass in each stratum surveyed.

Biomass estimates ranged from 1124 t in 1982 to 8090 t in 1977. The 1982 value is probably underestimated since two important strata (316 and 705) were not surveyed. Also, the survey was conducted in June, a time of year when witch are generally very dispersed. The high estimate in 1977 is a result one anomalously high catch in stratum 323 which resulted in a biomass estimate of 4878t for that stratum in 1977. The estimate for 1983, the only year when the survey was complete is about 5,000 t.

In order to standardize the survey data, a mean catch per 30 minute tow (kg) was calculated for all years for strata common to all years (Table 2). The means were weighted by stratum area. Although the means fluctuated wildly there was no obvious trend (Table 2, Fig. 2), however, with the exception of the anomalous 1982 value, the estimates were stable for 1980, 1981, and 1983 near 9 kg/tow.

Age composition from the 1974 survey is compared to that of the 1983 survey in Fig. 3. In 1974 the ages ranged from 2 to 18 years peaking at 9 years old. The ages in 1983 ranged from 2 to 13 years and still peaking at 9 years. While there is a clear reduction in the proportion of older fish between 1974 and 1983 the predominent mid range ages have not changed that greatly. A comparison of size at age between 1974 and 1983 indicates a substantial increase particularly in the more abundant age groups (Table 3). This would suggest that while the number of age groups has been considerably reduced, the levels of biomass may not have been adversely affected.

Table 1. Witch - average weight (kg) per 30 minute set - NAFO Subdivision 3Ps. (No. of sets shown in parentheses.)

Stratum	ATC 197 1972	ATC 207 1973	ATC 221 1974	ATC 234 1975	ATC 247 and 248 1976	ATC 261 1977	ATC 273 and 275 1978	ATC 287 1979	ATC 302 1980	ATC 316 1981	ATC 330 1982	A. Needler 009 1983
306			9.56(8)	4.20(6)	1.10(6)	3.21 (6)	1.49(9)	2.63(5)	1.72(2)	2.43(3)	0.70(3)	3.30 (4)
307	0.0 (3)	0.0 (5)	0.76(7)	0.0 (4)	0.34(4)	2.21 (4)	0.03(7)	0.0 (4)	0.45(2)	0.0 (3)	0.0 (4)	0.38 (4)
308		0.0 (2)	0.57(2)	0.0 (4)	0.0 (2)	0.0 (4)	0.0 (2)	0.0 (4)	0.0 (2)	0.0 (2)	0.0 (2)	0.0 (3)
309	1.31(4)	17.86(3)	10.84(8)	2.02(6)	1.91(7)	6.14 (6)	3.38(9)	3.97(6)	0.0 (2)	3.75(2)	0.0 (2)	3.00 (3)
310	9.53(3)	6.81(3)	6.70(4)	1.92(6)	2.84(4)	6.94 (6)	6.63(9)	4.01(6)	4.09(2)	6.00(2)	4.00(3)	1.67 (3)
311	0.85(4)	0.0 (9)	8.68(8)	4.77(4)	9.91(6)	24.29 (4)	1.25(8)	1.47(4)	0.22(2)	0.25(2)	0.0 (3)	0.0 (3)
312	0.0 (2)		0.79(2)	0.0 (3)	0.09(5)	0.91 (4)	0.0 (2)	0.0 (3)		0.0 (2)	0.35(2)	0.0 (3)
313	6.58(4)	6.19(4)	20.43(5)	33.29(3)	9.88(6)	8.32(10)	17.07(5)	6.17(5)	22.24(2)	25.00(2)	8.50(2)	10.17 (3)
314	0.0 (2)		0.0 (2)		0.0 (2)	0.28 (4)	0.0 (3)		0.0 (2)	0.0 (5)	0.0 (5)	0.0 (7)
315	0.0 (2)	0.0 (2)	0.0 (2)		0.0 (2)	0.34 (4)		0.0 (3)	0.0 (4)	0.0 (2)	0.40(3)	1.20 (8)
316	21.62(4)	18.89(5)	27.69(6)	37.79(2)	5.45(4)	33.33 (6)	15.17(6)	18.76(3)	5.90(2)	16.50(2)		41.00 (4)
317	4.99(4)	2.98(7)	25.99(8)	9.48(4)	39.50(4)	11.55 (4)	6.98(4)	0.0 (3)	4.43(2)	0.15(2)	5.17(3)	98.33 (3)
318	12.41(3)	25.88(2)	25.88(2)	1.69(4)	1.91(7)	6.05 (6)	5.90(2)	14.74(2)	7.26(2)		0.95(2)	10.07 (3)
319	5.22(4)	1.57(5)	11.80(2)	0.41(4)	1.25(4)	1.59 (6)	1.82(4)	0.91(2)	18.84(4)	16.50(2)	0.93(7)	1.00 (7)
320		0.0 (2)			0.15(3)				0.0 (6)	0.0 (2)	0.0 (4)	0.86(14)
321	0.0 (2)	0.0 (2)			0.68(2)		0.0 (3)		0.0 (5)	0.0 (2)	0.0 (4)	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)
323	0.91(3)				0.0 (4)	93.36(2)	0.15(3)		0.0 (3)	3.75(2)	1.00(2)	9.50 (6)
324					0.0 (2)			0.0 (2)	0.0 (2)		0.0 (2)	0.0 (4)
325					0.0 (2)		0.0 (2)	0.0 (2)	0.0 (4)	0.0 (2)	0.0 (5)	0.0 (8)
326							0.0 (2)	0.0 (2)	0.0 (2)	0.0 (2)	0.0 (2)	0.0 (3)
705			7.94(4)	3.97(2)	6.02(4)	7.15(4)	3.99(5)	13.39(4)	7.94(2)	12.50(2)		4.93 (3)
706			15.37(7)		8.55(3)	20.56(4)	8.63(2)	24.64(3)	9.99(2)	17.75(2)	2.40(4)	11.30 (5)
707			5.45(2)	20.32(4)	3.29(6)	1.29(4)	10.90(2)	11.13(2)	9.53(2)			6.10 (3)
708				24.21(3)	13.77(3)	6.23(4)		4.31(2)	0.80(2)			2.75 (2)
709					3.29(2)							0.15 (2)
710												1.79 (3)
711					12.49(2)				4.77(2)	7.30(2)	2.95(2)	5.49 (8)
712					2.73(2)			8.39(2)	6.13(2)	10.25(2)	1.30(3)	3.73 (7)
713				1.03(3)					4.31(2)	2.67(6)	1.20(2)	2.48 (7)
714					2.39(2)		4.20(2)		4.54(2)	5.70(8)	1.32(6)	1.31(10)
715				6.65(2)	3.81(5)	2.67(4)	9.08(6)	4.69(3)	3.29(2)	2.35(2)	1.50(2)	6.33 (3)
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)
Total tons	2360	2771	3714	1999	3396	8090	2052	2983	4330	5475	1124	4955

Table 2. 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

Table 3. Change in size at age for witch flounder between 1974-83 in NAFO Subdivision 3Ps from research vessel surveys.

Age	$\bar{L}$(cm) 1974	$\bar{W}$(gm) 1974	$\bar{L}$(cm) 1973	$\bar{W}$(gm) 1983	$\bar{W}_{83} - \bar{W}_{74}$	% Diff. in W
1	0.0	0	0.0	0	0	0
2	14.50	12	13.17	9	-3	-25.0
3	0.0	0	17.38	26	-	-
4	20.50	42	21.17	47	5	11.9
5	22.83	61	25.02	84	23	37.7
6	25.77	93	28.83	138	45	48.4
7	29.69	153	32.46	209	56	36.6
8	32.63	213	35.86	296	83	39.0
9	36.31	309	39.20	404	95	30.7
10	39.64	420	42.80	549	129	30.7
11	42.94	556	47.00	762	206	37.1
12	45.20	665	50.80	1000	335	50.4
13	47.46	788	55.50	1363	575	73.0

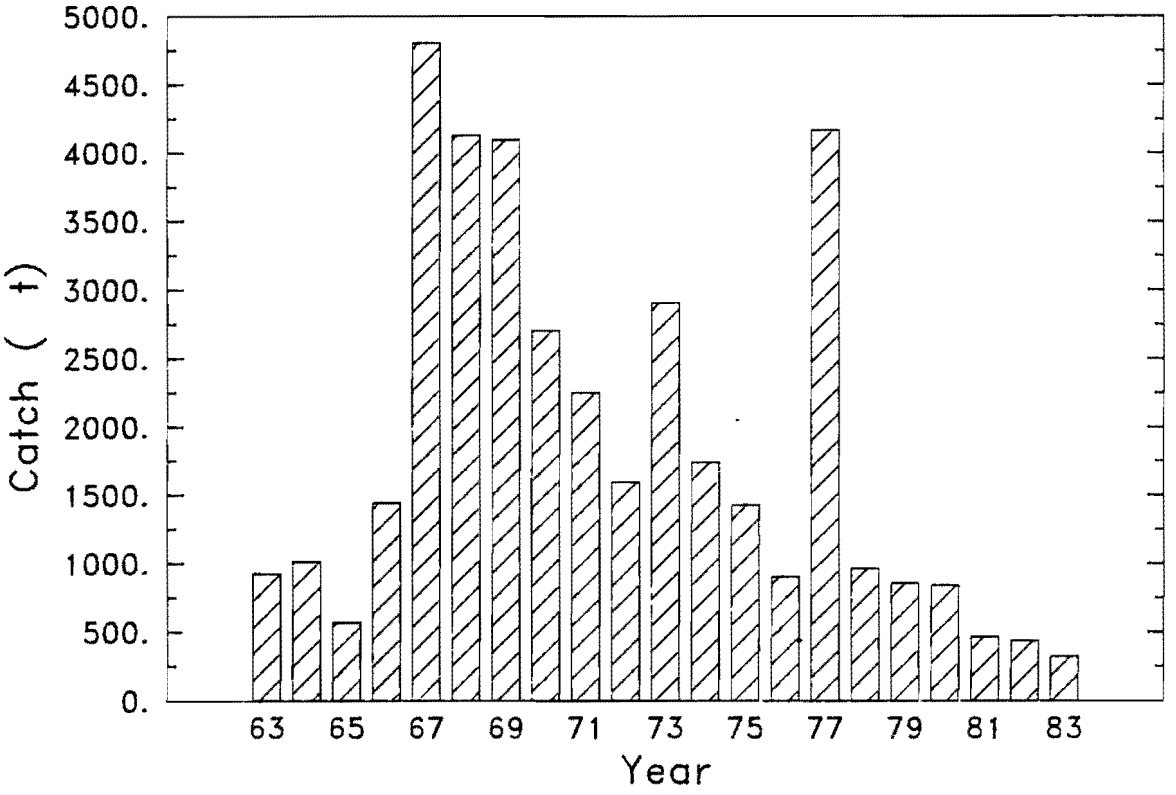

Fig.1: Nominal catches of witch in Division 3Ps (1983 Provisional)

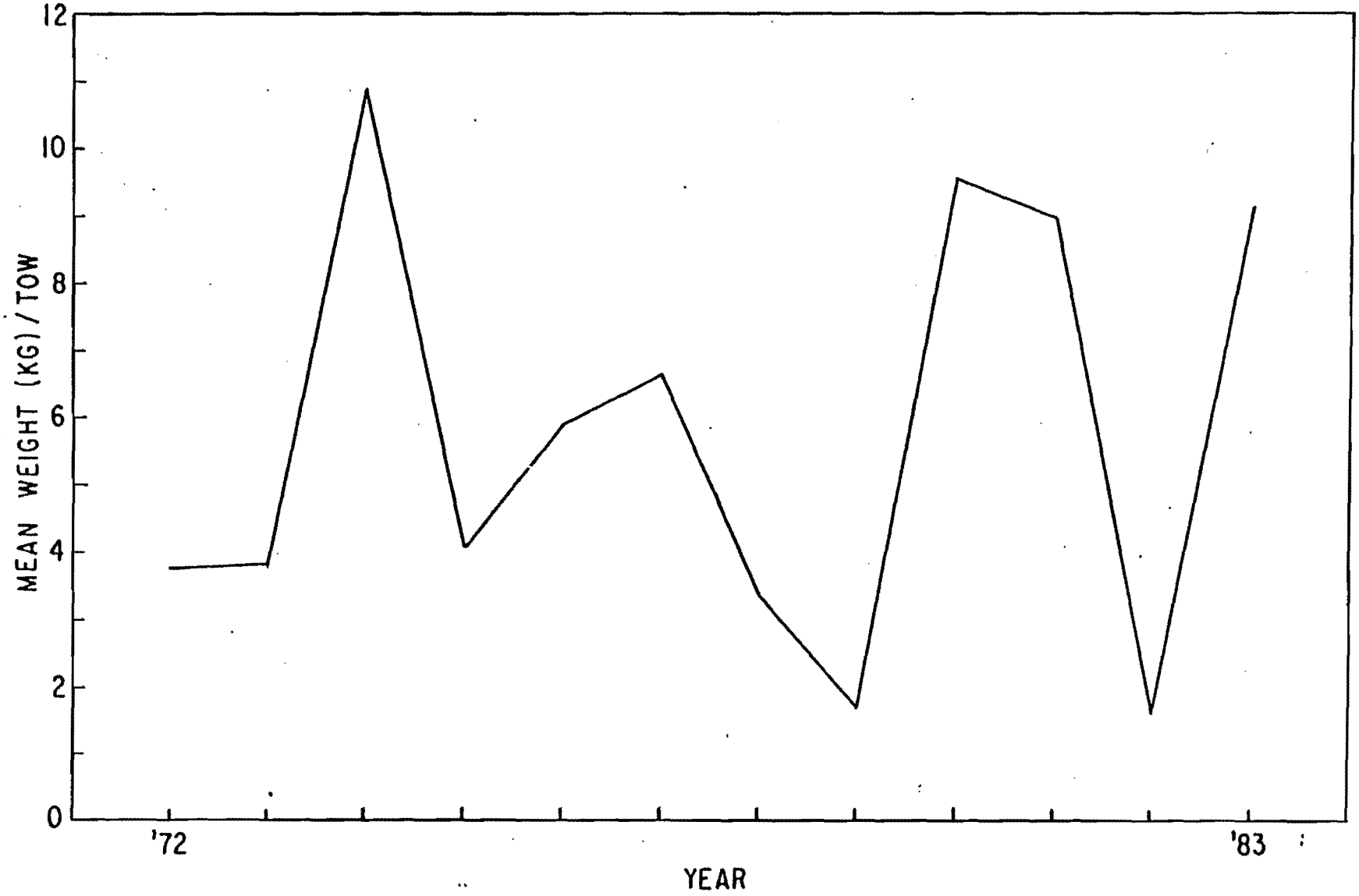

Fig. 2. Mean weight (kg) per 30 min tow of witch flounder on St. Pierre Bank (NAFO Subdivision 3Ps) from surveys 1972-83. Only strata common to all years were used.

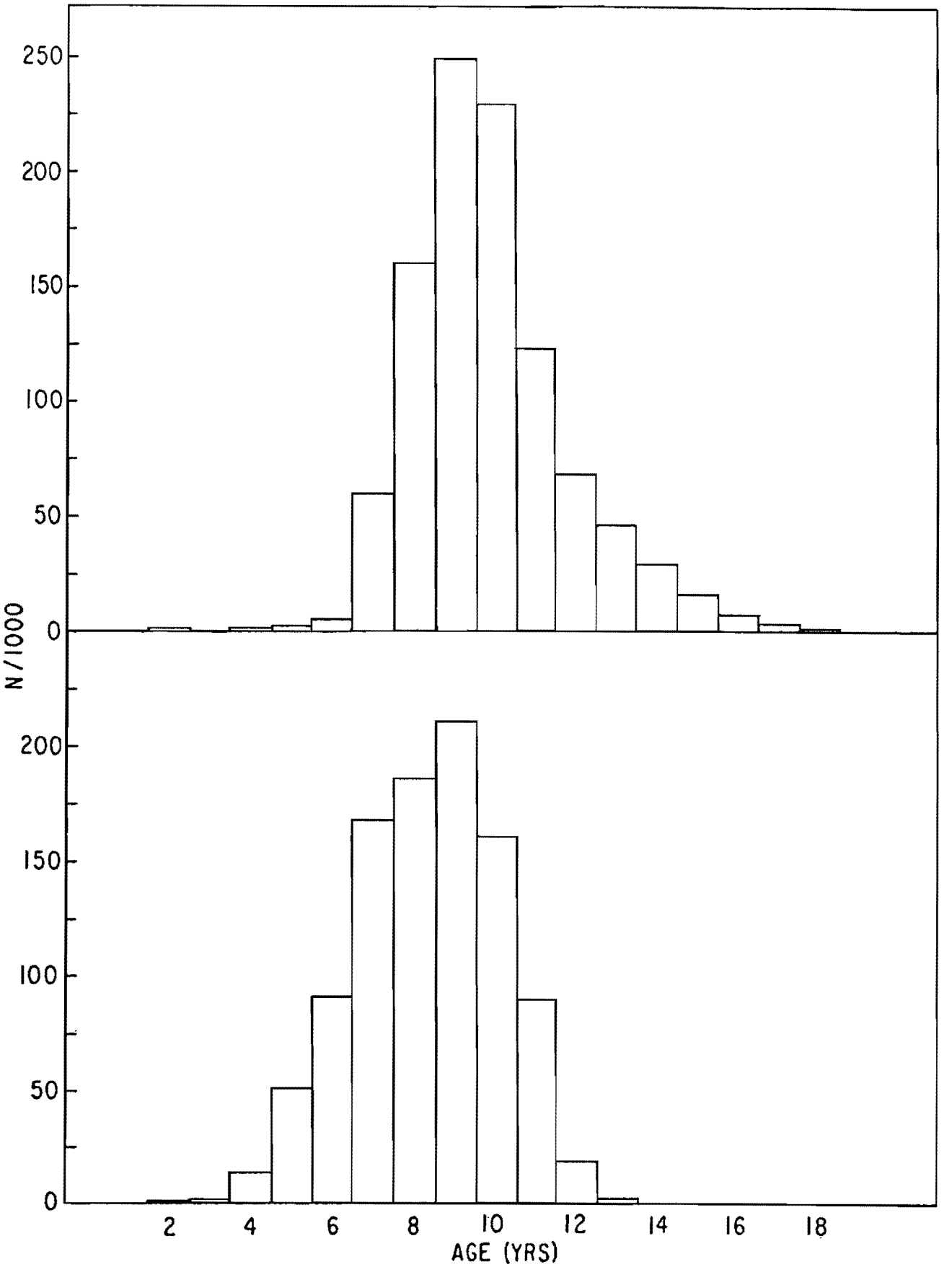

Fig. 3. Age distribution of witch flounder in NAFO Subdivision 3Ps from surveys in 1974 (above) and 1983 (below).