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Stock status of Atlantic argentine in Div. 4VWX.

by

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Abstract

Commercial fishery and research vessel data series concerning argentine stock status on the Scotian Shelf are updated by addition of 1986 data. Population size remains high in relation to levels in the 1970s and there is no apparent need to change previous advice for a reference catch level of 10,000 t.

Résumé

Les séries de données sur l'état des stocks d'argentines sur le plateau Scotian obtenues des navires de recherche et des bateaux de pêche commerciale sont mises à jour avec les données de 1986. La densité de la population demeure élevée par rapport avec les niveaux des années 1970, et il semble inutile de modifier l'avis émis antérieurement préconisant un niveau de référence de 10,000 t.

Introduction

The argentine fishery, which began in the early 1960s, has been prosecuted primarily by the USSR and Japan. TAC regulation was initiated in 1974 and, from the late 1970s, the fishery has been restricted in season and area by the Small Mesh Gear Line regulations. In recent years catches have been taken largely as bycatch in the silver hake fishery, the 1986 catch being about 200 t. Recent TACs and catches are ('000 t):

	1979	1980	1981	1982	1983	1984	1985	1986	1987
TAC	20	20	20	20	-[a]	10	10	10	10
Nominal Catch	3	2	+	+	1	+	+	+[b]	

[a] No TAC set but Japan allocated 3,100 t.
[b] Provisional statistics.

This document updates more extensive reports on stock status of Scotian Shelf argentine given by Halliday (1984) and Halliday and Dale (1985), and the most recent report of Dale and Halliday (1986).

Results

Historical catches, 1963-86, by Subarea and country are given in Table 1. The provisional catch for 1986 is the lowest since separate reporting of statistics was initiated in 1963.

Commercial catch sampling through the International Observer Program allows estimated removals-at-length to be calculated for 1980-86. Total numbers removed were calculated by dividing total weight caught by mean weight of individual fish in catch samples. Sampling coverage has been high (Table 2), and remained good in 1986, although lower numbers of samples were taken in keeping with the declining catch.

Removals have varied between 0.9 and 8.4 million fish in 1980-86 (Table 2). In 1986 length-frequency of removals remained flat-topped, but over an abbreviated length range compared to the previous year, 25-31 cm fish being evenly represented (Fig. 1).

Research vessel biomass estimates are available for spring and fall of 1979-84 and summer of 1970-86 (Table 3). The 1986 estimate was higher than that for 1985 and was the third highest estimate in the time series. Smoothed data (Fig. 2) suggest that 1986 biomass was at or above the highest levels recorded since 1970.

Research vessel population length-frequency estimates from recent cruises (1982-86) show that a strong year-class has tended to dominate population size structure (Fig.3). This year-class was likely responsible for the mode at 30 cm in July 1986 (Fig. 3b).

Discussion

Research vessel surveys indicate that biomass continued to increase from a low in the mid-1970s to a high in 1986. The peak in biomass in 1982-83 resulted from recruitment of a large year-class, apparently that of 1980, to the population. It is this year-class which continues to be responsible for maintaining biomass levels in the last 3 years as there is no indication that subsequent year-classes have been strong.

Previous advice for a catch level of 10,000 t was based on an average biomass level from surveys in the 1960s and an estimate of $F_{0.1}$. Hence the advice relates to the expected long-term average catch. Present biomass level is above the average for the 1970-86 period and exploitation rate has been low in recent years with catches of less than 1,000 t per year. The present biomass level cannot be compared directly with those from the 1960s because of different survey methods but, in any case, the present data on stock status do not provide a basis, or identify a need, for a change in previous advice for a reference catch level of 10,000 t.

References

Dale, C.E. and R.G. Halliday. 1986. Argentine in Div. 4VWX - 1986 stock status update. CAFSAC Res. Doc. 86/30, 11 pp.

Halliday, R.G. 1984. Stock status of the argentine, *Argentina silus* Ascanius, on the Scotian Shelf (Div. 4VWX). CAFSAC Res. Doc. 84/38, 17 pp.

Halliday, R.G. and C. Dale. 1985. Atlantic argentine (*Argentina silus* Ascanius): stock status on the Scotian Shelf and a discussion of relationships with Georges Bank argentine. CAFSAC Res. Doc. 85/44, 21 pp.

Table 1. Nominal catches (t) of *Argentina silus* by NAFO Subarea and country, 1963-86.

Year	NAFO SUBAREA 1	2	3	4	5	6	TOTAL	COUNTRY USSR	FRG	Japan	Cuba	Misc.	Unknown
1963	-	-	-	8,127	4,210	-	12,337	12,337	-	-	-	-	-
1964	13	-	-	4,943	12,830	952	18,738	18,725	13	-	-	-	-
1965	-	-	-	5,611	9,453	166	15,230	15,230	-	-	-	-	-
1966	-	-	119	14,983	33,938	-	49,040	49,040	-	-	-	-	-
1967	-	-	825	4,271	2,026	-	7,122	7,015	-	42	-	65	-
1968	-	-	449	2,675	1,481	853	5,458	4,184	-	1,274	-	-	-
1969	-	5	106	5,354	2,608	5	8,078	5,707	-	2,338	-	28	5
1970	-	-	793	4,553	1,369	10	6,725	2,614	-	4,100	-	1	10
1971	-	-	532	6,715	7,293	-	14,540	5,535	-	9,003	-	2	-
1972	-	-	262	5,868	32,707	-	38,837	38,127	-	710	-	-	-
1973	-	-	138	1,444	2,512	-	4,094	3,691	-	403	-	-	-
1974	-	-	545	17,496	19,695	-	37,736	37,172	-	557	-	7	-
1975	-	-	16	14,691	1,398	68	16,173	16,052	-	56	-	65	-
1976	-	-	163	7,010	322	-	7,495	6,895	-	384	112	104	-
1977	-	-	-	2,489	-	-	2,489	219	136	2,115	15	4	-
1978	100	-	-	1,897	-	-	1,997	330	101	1,545	21	-	-
1979	228	-	-	2,640	-	-	2,868	232	228	2,407	1	-	-
1980	-	-	-	2,053	-	-	2,053	528	-	1,521	4	-	-
1981	19	-	-	369	-	-	388	71	19	298	-	-	-
1982	17	-	12	417	-	-	446	201	17	174	54	-	-
1983	-	-	-	863	-	6	869	351	-	148	364	6	-
1984	-	-	13	360	-	-	373	201	-	20	152	-	-
1985[1]	-	-	67	291	-	-	358	157	-	24	177	-	-
1986[2]	-	-	-	202	-	-	202	106	-	40	56	-	-

[1] Provisional statistics obtained from NAFO.

[2] Provisional statistics obtained from FLASH.

Table 2. Summary of International Observer Program samples used to estimate removals of argentine in Div. 4VWX, 1980-1986, associated catches (t) from NAFO statistics, and estimated numbers removed (thousands).

Year	Country	No. of Samples	Number Measured	Associated Catch (t)	Number Removed (10^{-3})
1980	Cuba	-	-	4[2]	16
	Japan	82	15527	1521	6088
	USSR	83	10753	528	2283
	TOTAL	165	26280	2053	8387
1981	Japan	16	4090	298	1088
	USSR	10	1662	71	380
	TOTAL	26	5752	369	1468
1982	Cuba	15	2835	53	857
	Japan	5	1136	163	1120
	USSR	31	5728	201	2670
	TOTAL	51	9699	417	4647
1983	Cuba	17	2741	364	2800
	Japan	7	1487	148	1048
	USSR	31	6283	351	2808
	TOTAL	55	10511	863	6656
1984	Cuba	21	3052	151	981
	Japan	8	664	8	82
	USSR	44	7233	201	1290
	TOTAL	73	10949	360	2353
1985	Cuba	32	4195	144	827
	Japan	17	2331	22	44
	USSR	21	3154	125	945
	TOTAL	70	9680	291	1816
1986[1]	Cuba	3	381	56	359
	Japan	10	1205	40	76
	USSR	14	2136	106	505
	TOTAL	27	3722	202	940

[1] Provisional statistics from FLASH.
[2] Assumed to have same length composition as total (Japan + USSR).

Note: Sample weighting was by month and unit area within country where sampling level permitted. Distribution of catch among unit areas was based on ratios of observed catches in IOP. This assumes that distribution of observed catches by unit area was representative of distribution of total catch.

Table 3. Biomass estimates of *Argentina silus* on the Scotian Shelf from stratified-random bottom trawl surveys in a) Fall, b) Spring, and c) Summer. (Biomass in metric tons. A = A.T. Cameron, H = Lady Hammond, N = Alfred Needler.)

Cruise	Year	AREA[1] Fundian Channel - Bay of Fundy	Central Shelf	Banquereau-Sable Island	Total
a) FALL					
H26/27	1979	3135	565	22[3]	3722
H42/43	1980	3407	917	24	4348
H64/65	1981	1449	1358	206	3013
H84/85[2] (N02/03)	1982	10353 (-)[3]	4134 (8009)[3]	68 (31)[3]	14555 (8040)
N17/18	1983	115	2255	58	2428
N36/37	1984	446	1881	96	2423
b) SPRING					
H13/14	1979	271[3]	209	0	480
H33/34	1980	1598	1286	20	2904
H48/49	1981	327[3]	2293	372	2991
H71/72	1982	111[3]	2988	1707	4806
H94/95	1983	991	15087	762	16840
N24/25	1984	528	4146	413	5087
c) SUMMER					
A175/176	1970	4637	768	78	5483
A188/189	1971	3236	1705	623	5564
A200/201	1972	618	170	183	971
A212/213	1973	1081	1318	127	2526
A225/226	1974	1085	1591	104	2780
A236/237	1975	242	135	188	565
A250/251	1976	1806	244	0	2050
A265/266	1977	5622	2288	5	7915
A279/280	1978	24900	1603	11	26514
A292/293	1979	4047	3264	108	7419
A306/307 (H37/38)	1980	3065 (1056)	556 (2704)	71 (173)	3692 (3933)
A321/322 (H59/60)	1981	4202 (18324)	1735 (523)[3]	83 (88)	6020 (18935)
- (H80/81)	1982	- (395)	- (3312)	- (392)	- (4099)
N12/13 (H101/102)	1983	2678 (3395)	9785 (9004)[3]	63 (72)	12526 (12470)
N31/32	1984	766	3734	191[3]	4691
N48/49	1985	5252	7078	20	12350
N65/66	1986	2350	13193	1610	17153

[1] Fundian Channel-Bay of Fundy = Strata 80-95; Central Shelf = Strata 60-78; Banquereau-Sable Island = Strata 46-59.

[2] Preliminary analysis - data editing not complete.

[3] Important strata not sampled. (H13/4:72. H26/7:46,49-52. H48/9:83/84. H59/60:60-61,65-66, 72,77. H71/2:83. H101/2:61,65-66,72. N02/3:49-54,77-78,80-91; N31/2:46.)

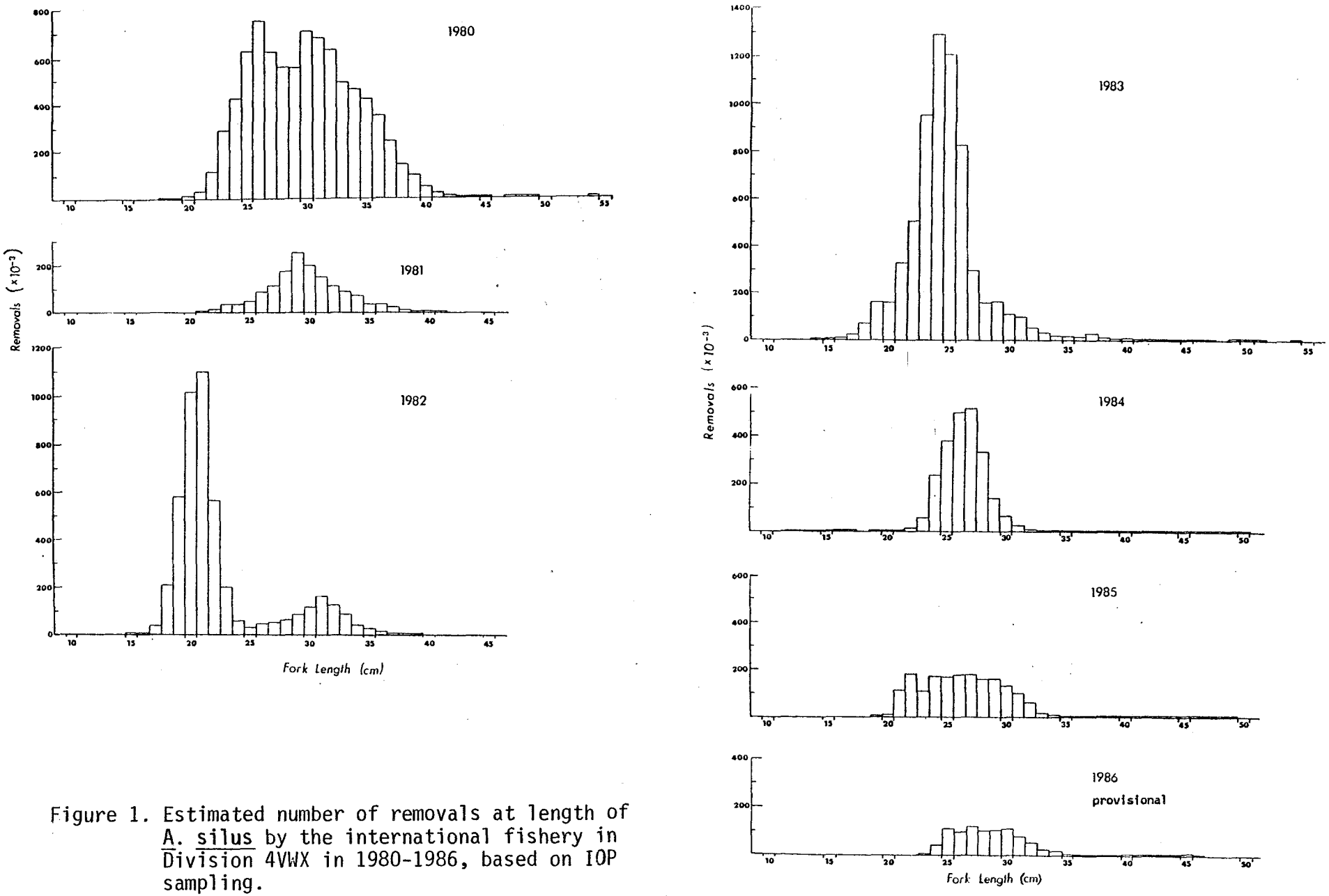

Figure 1. Estimated number of removals at length of A. silus by the international fishery in Division 4VWX in 1980-1986, based on IOP sampling.

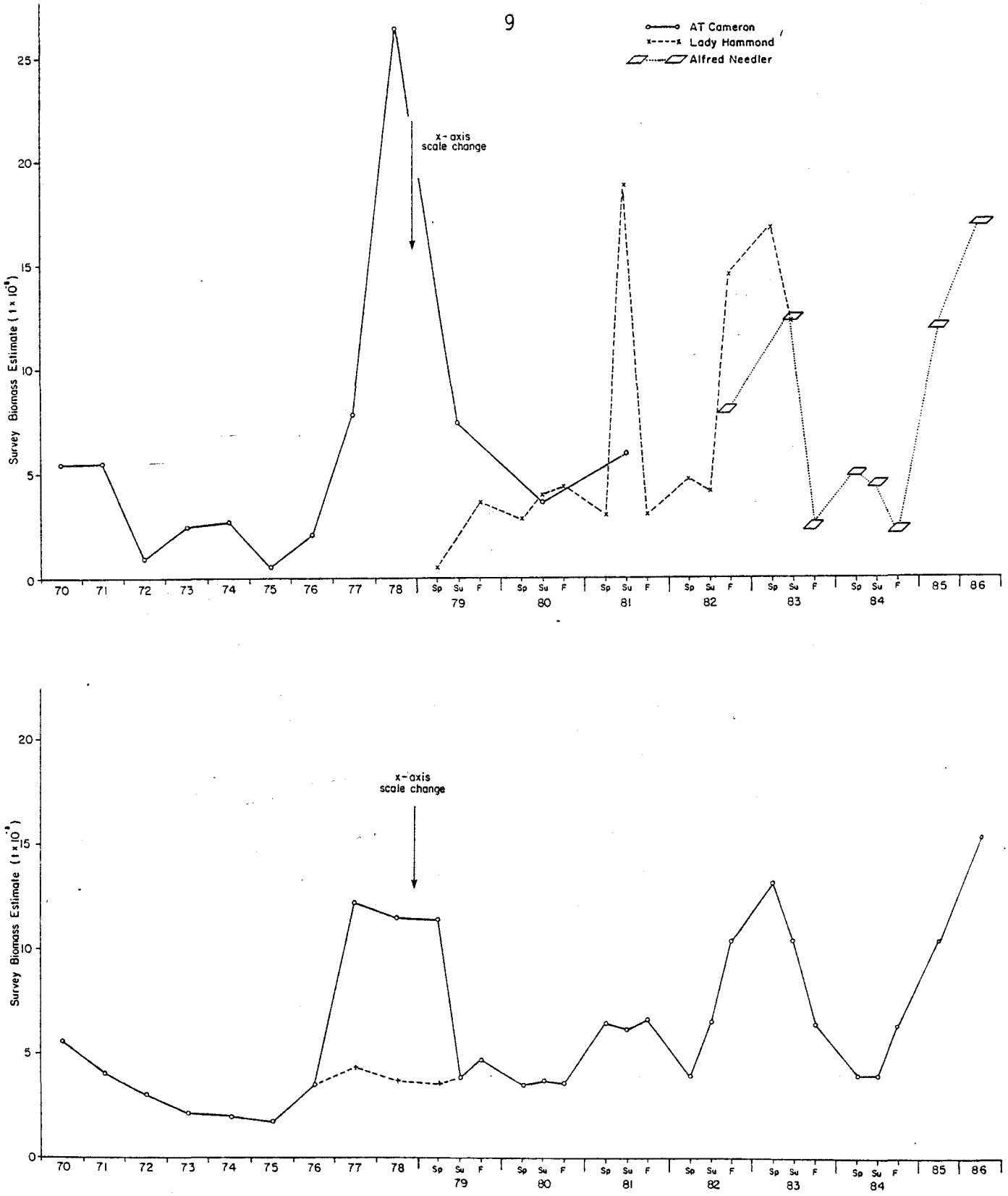

Figure 2. Population biomass estimates of A. silus in Division 4VWX, 1970-86, from stratified-random bottom trawl surveys. Upper: unadjusted estimates by vessel. Lower: smoothed estimates using 3-point running means (first and last points given double weight in calculating 2-point mean); estimates unadjusted for vessel or season but estimates for the same season and year averaged before smoothing. Dashed line connects mean recalculated after exclusion of one large set in 1978. Arrows indicate x-axis scale change.

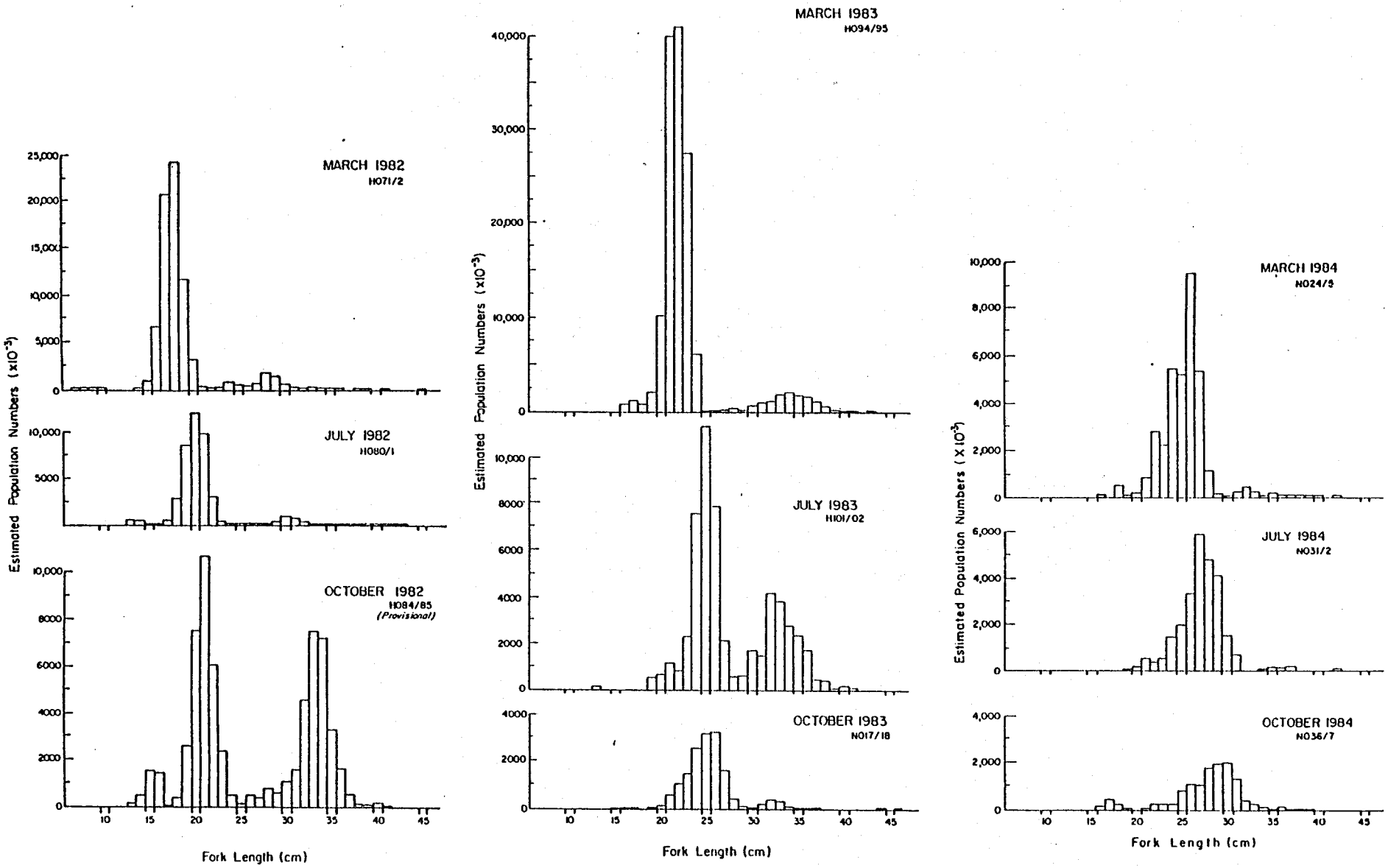

Figure 3a. Estimated population numbers at length of A. silus in Division 4VWX from stratified-random bottom trawl surveys conducted seasonally (spring, summer and fall) from March 1982 to October 1984. (Note change of vertical scale by x 2.5 for large estimates.)

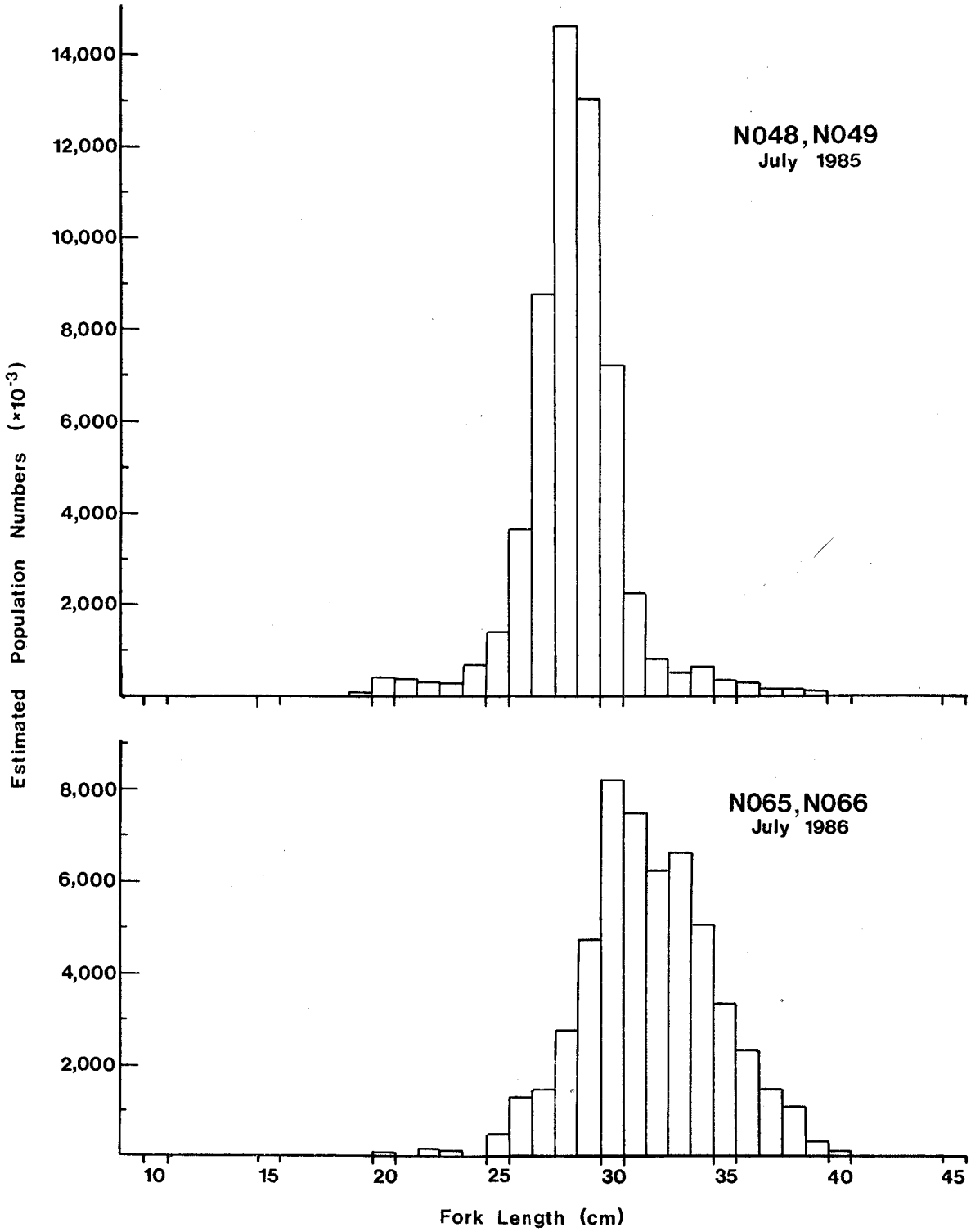

Figure 3b. Estimated population numbers at length of A. silus in Division 4VWX from stratified-random bottom trawl surveys conducted in July of 1985 and 1986.