

Biomass estimates from Canadian research vessel surveys,

Div. 4VWX, 1970-78

by

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Groundfish biomass on the Scotian Shelf has been estimated from Canadian research vessel surveys since 1970. This paper describes trends in these estimates between 1970 and 1978 with emphasis on the 1978 results in relation to earlier years. The surveys are conducted in July by RV A. T. Cameron using a stratified (Fig. 1) random sampling design and a Yankee #36 trawl (Halliday and Kohler 1971).

Biomass estimates between 1970-1975 showed no major trends (Fig. 2). The lowest estimate on record (excluding squid) occurred in 1976, largely due to reduced redfish catches. The following year produced the highest estimate of the eight-year period with substantial increases in haddock, redfish, cod and dogfish.

In 1978, total biomass decreased from the record maximum in 1977, but it was still above the eight-year average and the third highest on record (Fig. 2, Table 1). Much of the decrease was due to very low catches of dogfish. Both cod (Fig. 3) and redfish (Fig. 5) continued to increase and

accounted for 52% of the biomass on the 1978 estimates. Redfish biomass was the highest, and cod the second highest recorded since the surveys began in 1970. Although the haddock biomass index decreased, it was still well above the eight-year mean and the second highest recorded (Fig. 4). The silver hake index increased from 1977 but it was below the eight-year mean. All other fish species or groups decreased from 1977 and were lower than the eight-year mean (Table 1). This was also true of squid, which continued to decline from the record high of 1976 (Fig. 6).

Table 1 also gives the biomass estimates for groups of strata corresponding to ICNAF Subdivisions 4V, 4W and 4X. In the past, the total biomass estimate for Div. 4X (Strata 70-95) has generally been higher than Div. 4V (Strata 40-52) and 4W (Strata 53-66). In 1978, however, the index for Div. 4W was highest while Div. 4V and Div. 4X were both below the eight-year mean. Much of this apparent shift in biomass can be attributed to cod, haddock and redfish which all had a greater proportion of their biomass in Div. 4W in 1978.

References

Halliday, R. G., and A. C. Kohler. 1971. Groundfish survey programmes of the St. Andrews Biological Station, Fisheries Research Board of Canada - objectives and characteristics. ICNAF Res. Doc. 71/35, 25 pp.

Table 1. Minimum biomass estimates from Canadian research vessel surveys-
Div. 4VWX (mt x 10⁻³).

<u>Species</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	\bar{X} <u>(1970-77)</u>	<u>1978</u>
Cod	113.0	142.4	113.2	249.3	80.2	81.7	96.0	133.7	126.2	164.3
Haddock	63.2	65.9	33.4	38.5	83.6	59.1	54.0	206.5	75.5	115.7
White hake	67.7	12.5	20.8	42.3	35.6	48.8	22.3	35.5	35.7	31.8
Silver hake	23.5	7.9	15.3	38.2	36.1	7.5	18.6	8.2	19.4	11.0
Redfish	172.3	186.3	229.3	196.5	89.6	245.4	83.5	171.6	171.8	276.0
Flatfish*	81.0	80.8	79.2	81.7	133.2	101.6	116.6	112.3	98.3	70.7
Skates	48.2	34.3	47.8	77.8	52.2	87.6	41.9	50.3	55.0	43.3
Dogfish	43.6	141.9	26.0	35.9	51.7	7.2	8.6	163.1	59.8	2.5
Others**	99.2	67.5	84.5	105.2	96.2	116.1	297.9	214.3	135.1	130.1
(Squid)	(1.9)	(14.7)	(3.2)	(8.9)	(9.5)	(24.8)	(203.7)	(46.6)	(39.2)	(11.2)
Total	711.7	739.5	649.5	865.4	658.4	755.0	739.4	1095.5	776.8	845.4
Div. 4V (Strata 40-52)	187.1	250.9	198.0	169.6	173.4	169.8	231.3	221.6	200.2	163.4
Div. 4W (Strata 53-66)	244.7	149.6	120.3	337.6	191.2	337.6	173.5	282.8	228.7	461.5
Div. 4X (Strata 70-95)	279.9	339.0	331.2	358.2	293.8	255.1	334.6	591.1	347.9	220.5

*Halibut and turbot are included in flatfish

**Squid are included in others and separately in brackets ()

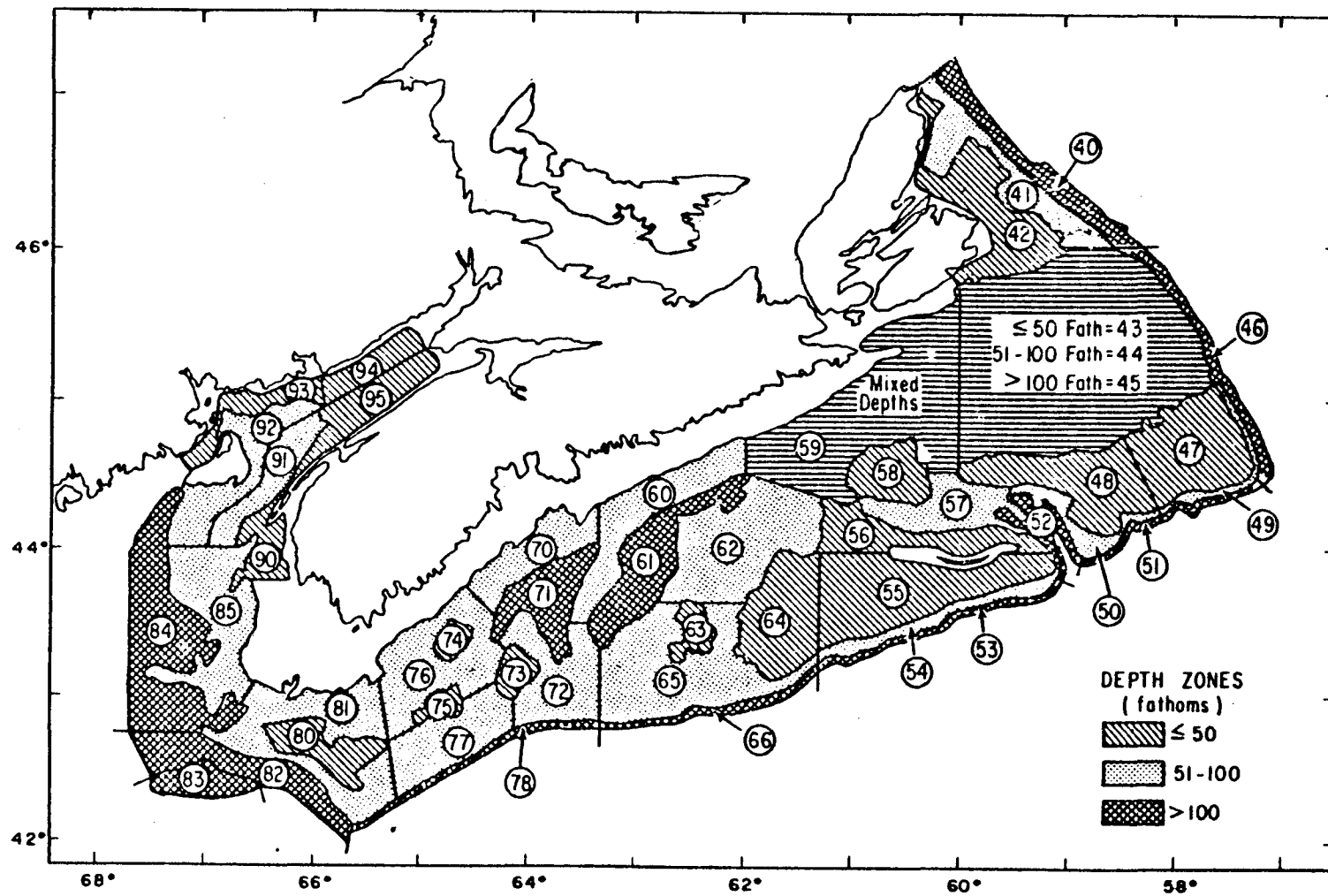


Fig. 1. Stratification scheme for ICNAF Subdivisions 4V-W-X adopted in 1970.

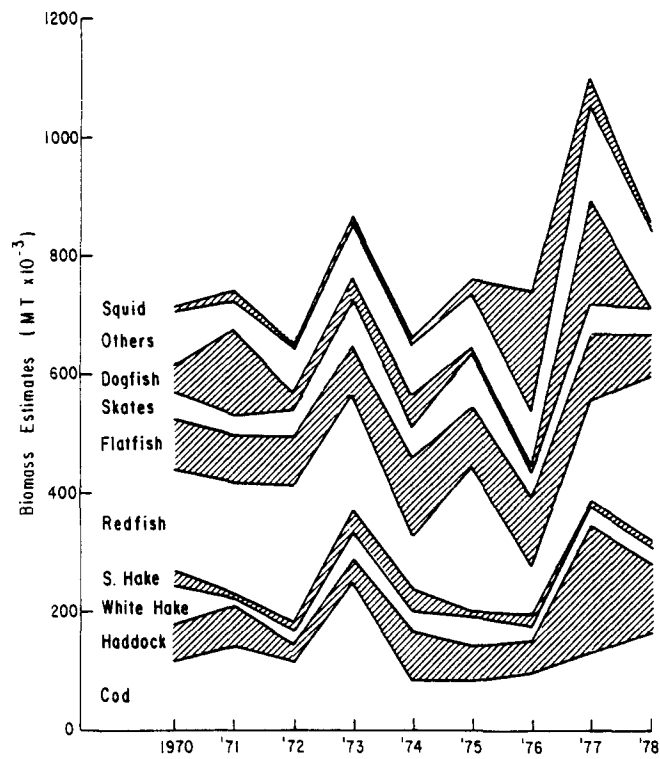


Fig. 2. Groundfish survey biomass estimates, Div. 4VWX.

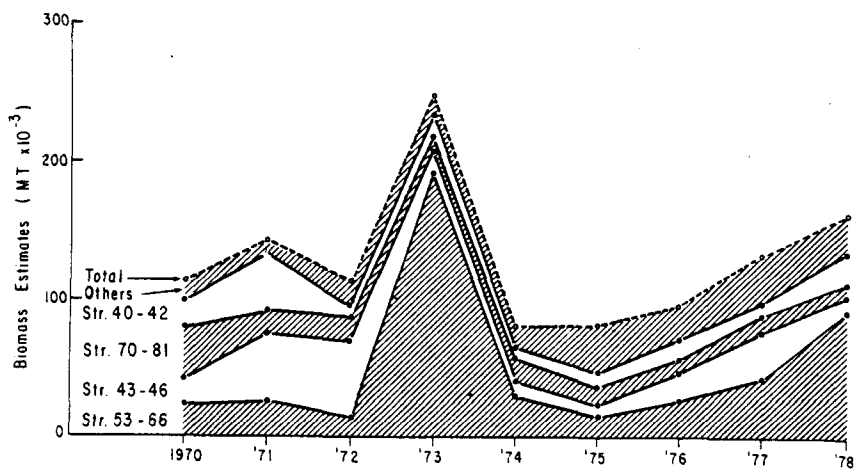


Fig. 3. Biomass estimates for groups of strata from groundfish surveys, Div.4VWX, 1970-78. Cod.

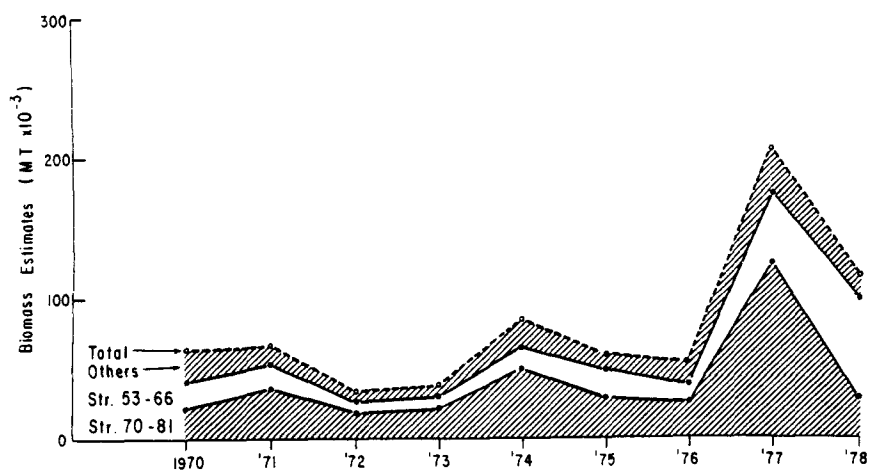


Fig. 4. Biomass estimates for groups of strata from groundfish surveys, Div. 4WX, 1970-78. Haddock.

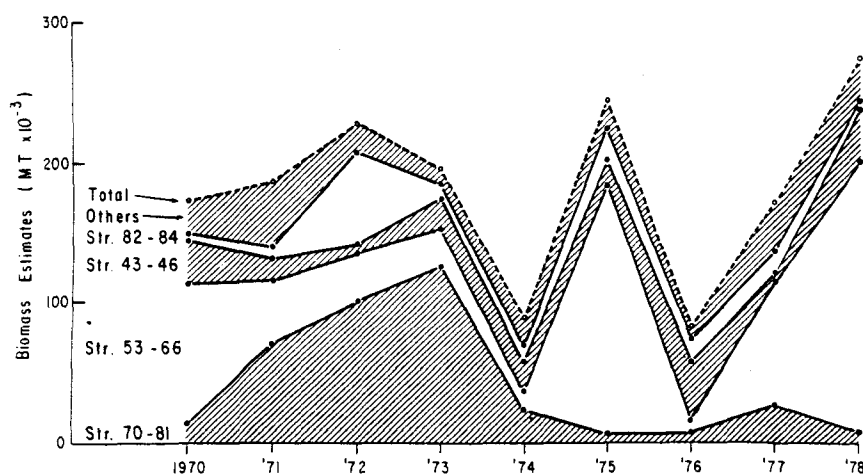


Fig. 5. Biomass estimates for groups of strata from groundfish surveys, Div. 4VWX, 1970-78. Redfish.

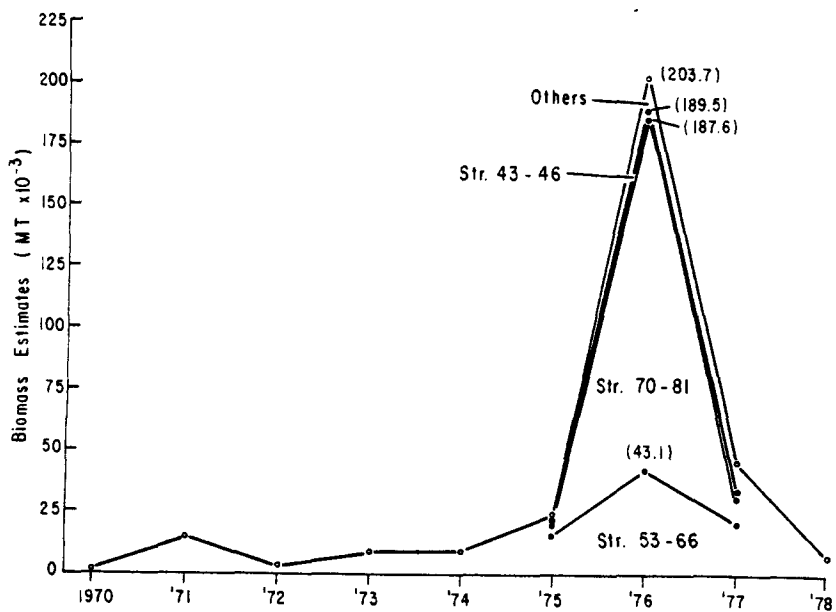


Fig. 6. Biomass estimates for groups of strata from groundfish surveys, Div. 4VWX, 1970-78. Squid.